THE DEVELOPMENT OF HARVARD UNIVERSITY
1869–1929

EDITED BY SAMUEL ELIOT MORISON

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CHRISTO ET ECCLESIAE

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PUBLISHER'S NOTE

This volume introduces the tercentennial history of Harvard University with which Professor Morison is now engaged and which will appear before the celebration, in 1936, of the three hundredth anniversary of the founding of the college. Although this book will eventually form part of the series, it is complete in itself. Each one of its thirty-eight chapters is devoted to a branch of learning taught in the University or to a Department of the University. Each is written by the head of the Department or some other authority whose memory goes back a considerable distance into the past. George Herbert Palmer, for instance, writes on the early days of the Department of Philosophy; Walter R. Spalding, on Music — including undergraduate as well as departmental activities; Charles H. Grandgent, on the Modern Languages; William Morris Davis and Reginald A. Daly, on Geology and Geography; Charles H. Haskins, on the Graduate School of Arts and Sciences; Dean Pound, on the Law School; Dean Donham, on the Graduate School of Business Administration; William Coolidge Lane, on the Library. In addition, there are preliminary chapters on government, administration, and the religious life of the University, and the history of the elective and tutorial systems. This preliminary section also includes the inaugural addresses of President Lowell and of President Eliot. Covering as it does the administrations of these two great leaders, the volume has importance far beyond the circle of Harvard men; it presents an unrivalled view of contemporary American intellectual effort, illuminated by the personality of men actively engaged in widening the bounds of human knowledge.

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This is the first volume of the Tercentennial History of Harvard University to appear. The next will be a History of Harvard College, 1636–1869, in two or perhaps three volumes. The present volume will be numbered after these, when the Tercentennial History is complete.

THE TERCENTENNIAL HISTORY OF HARVARD COLLEGE AND UNIVERSITY
1636–1936

LONDON : HUMPHREY MILFORD
OXFORD UNIVERSITY PRESS

Charles W. Eliot

THE DEVELOPMENT OF HARVARD UNIVERSITY

SINCE THE INAUGURATION OF PRESIDENT ELIOT

1869–1929

EDITED BY

SAMUEL ELIOT MORISON

CLASS OF 1908

Cambridge, Massachusetts
HARVARD UNIVERSITY PRESS
1930

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PREFACE

ORDINARILY, in the history of a country or an institution from the beginning, the latest period is the most neglected. By the time he reaches it, if indeed he survives so long, the historian has become old and weary. His own era appears hopelessly complicated. The essential facts are so difficult to obtain and refractory to compose, that the history is apt to peter out sadly. In order to make certain that this will not happen to the Tercentennial History of Harvard University, I have chosen to prepare this latest period first, with the aid of my colleagues in the various faculties and schools of the University. Future historians will be able to see these events in better perspective than we. For us, however, there is the unique opportunity to have the story of a revolution in education related by men who took an active part therein.

During the past sixty years, the University has grown more rapidly and significantly than at any period since its foundation. Harvard, to be sure, was no mean university before 1869. When Mr. Eliot became president, the Law, Medical, and Divinity Schools were over fifty years old; the Lawrence Scientific School was well established; Agassiz had founded the University Museum; scholars such as Child, Peirce, Gibbs, and Goodwin were on the College faculty; and many distinguished men were on the roll of alumni. Yet so revolutionary were the changes in administration and instruction during the next thirty years, so great was the expansion of staff and curriculum in order to keep pace with the advance of human knowledge, that the University was practically made over from top to bottom. There has been no let-up in this process of growth and experimentation. Mr. Lowell's administration has been one of reformation no less than Mr. Eliot's, although in a different direction.

The position of Harvard has been such that this growth and change have been intimately related to the social and intellectual history of the United States. They may be regarded as a phase of American expansion: not in numbers, but in the depth and diversity of American life. Further, it has been an era fertile in great scholars and inspiring teachers, whose influence went far beyond the confines of the University. The reader of this volume will find such men as James, Henry Adams, Lane, Dunbar, Cooke, Sabine, Paine, Pickering, Shaler, Farlow, Wyman, Thayer, and Cheever described by their former colleagues and pupils.

Even with a division of labor, this volume could not be a complete history of Harvard since 1869. It is a history of the University as an institution of learning. "College life" has been touched upon only incidentally; athletics not at all; finance, only here and there. These subjects I hope to deal with, for the same period, in a later volume.

As an introduction, especially for readers unfamiliar with the American university background, there are chapters on the government and administration of the University, the system of College studies, and the operation of voluntary religious worship. With these are included the texts of Mr. Eliot's and Mr. Lowell's inaugural addresses, keys to their respective administrations. Then follow twenty-five chapters on the history of those branches of learning administered by the Faculty of Arts and Sciences, and of certain museums closely connected with them. The last third of the volume consists of thirteen chapters on the history of the graduate and professional schools of the University, together with the College Library, the Meteorological Observatory, the Lawrence Scientific School and its successors. A few subjects such as Oriental Languages (other than Semitic), Military and Naval Science, and the Summer School, have for one reason or another not found a place here. I hope to make the deficiency good later in the series.[1]

I have made no attempt to standardize these chapters, nor, with Harvard contributors, could any such effort have been successful. The chapters do not even begin at the same date; since the year 1869 did not prove an acceptable dividing line for some subjects, and others had not yet entered the University. Each author has told the story in his own way. Each has performed his part as a labor of love. To all I am deeply indebted, not only for what they have done, but for their kindly tolerance of editorial sins: a spirit that has made my part of the work a pleasure.

For the choice of illustrations, I am responsible. It has been my desire to make them representative of the great teachers and scholars connected with the University during the last sixty years. Harvard men will miss many, even among the more eminent and beloved; for all such could not be included. Owing to the refusal of several authors of chapters to let their portraits appear therein, I have extended the same principle of exclusion to all contributors to this volume, unless their likenesses could consistently be smuggled into chapters other than their own.

The Tercentennial History of Harvard University will probably consist of four volumes. The next, which I am now writing, will cover approximately the first century of the history of Harvard College, together with the English university background. Whether one or two volumes will be required for the period between the early eighteenth century and 1869, I cannot yet predict. It will depend on that whether the present volume be numbered III or IV when the series is complete. Completed it should be by a volume supplementing the present one by relating the story of undergraduate life during the last sixty years, and carrying the history of the University through the tercentennial celebration in 1936.

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[1] It is particularly regrettable that the ill health of Charles R. Lanman (LL.D. *Yal. et Aberdon.*) prevented him from contributing a chapter on Sanskrit and Indic Philology, of which he was Professor from 1880 to 1926. The *Harvard Oriental Series*, edited by him, has been one of the most notable contributions of the University to exact scholarship and humane letters.

Throughout the Tercentennial History, the name of a Harvard graduate, when first or principally mentioned, will be followed by the date and abbreviation of his first Harvard degree. Abbreviations such as '78, '27, will be used only for undergraduates, or for alumni who did not take a degree. Honorary degrees will not usually be mentioned. The name of a non-Harvard graduate will ordinarily be followed by the date and abbreviation of his highest degree obtained elsewhere. Academic titles such as Professor, Doctor, and the like, will be omitted wherever possible. The reader will please not expect complete consistency in these matters; and for full information respecting degrees, promotions, and academic honors of Harvard graduates and officers, he is referred to the Quinquennial Catalogue of Harvard University. Many other data will be found in the annual Harvard University Catalogues, and in the Annual Reports of the President and Treasurer. These have been used so frequently in the text of this volume that they are seldom cited in footnotes.

I shall be grateful to readers for knowledge of any errata they may discover. Their enjoyment of future volumes will be greater, and my own labors will be more fruitful, if persons who have unpublished letters, journals, or scrapbooks of Harvard undergraduates, even down to recent times, will communicate them to me, or deposit them in the College Library. No university historian can be content to tell the story from the professorial angle alone; yet the undergraduate point of view, being the least frequently recorded, is the most difficult to recover. There are long stretches of years in the earlier history of the College for which as yet I have found little of this human sort of material, without which the story of Harvard, in the days when it was still a small, homogeneous college, would be lifeless indeed. If investigators in other fields, especially in nineteenth-century American newspapers, will keep an eye cocked for Harvard items, they, too, will earn my sincere gratitude.

S. E. Morison

September, 1929

CONTENTS

INTRODUCTION xxiii
1. Government and Administration, 1869–1929 xxv
2. College Studies, 1869–1929 xxxix
3. Voluntary Worship, 1886–1929, by Francis G. Peabody, S.T.D. li
4. President Eliot's Inaugural Address lix
5. President Lowell's Inaugural Address lxxix
6. Tables of Growth, 1868–1929 lxxxix

PHILOSOPHY, 1870–1929 3
GEORGE HERBERT PALMER, LL.D., *Alford Professor of Natural Religion, Moral Philosophy, and Civil Polity, Emeritus.*
RALPH BARTON PERRY, Ph.D., *Professor of Philosophy.*
Personnel, 3 — James, 4 — Royce, 9 — Santayana, 15 — Münsterberg, 17 — Palmer, 20 — Pupils and Successors, 21 — Organization, 24 — Instruction, 26.

THE CLASSICS, 1867–1929 33
HERBERT WEIR SMYTH, Ph.D., *Eliot Professor of Greek Literature, Emeritus.*
The Classics and the Elective System, 33 — The Staff, 37 — Instruction in the Graduate School, 52 — Undergraduate Instruction, 55 — Postscriptum, by Lucien Price, 63.

THE MODERN LANGUAGES, 1869–1929 65
CHARLES H. GRANDGENT, Litt.D., *Professor of Romance Languages.*
The Older Generation, 65 — Administration, 68 — Growth of the English Department, 74 — From German to Germanic, 81 — Neo-Latin, 85 — Fresh Fields, 91 — Auxiliaries, 94 — The Product, 98 — Conclusion, 103.

MUSIC, 1862–1929 106
WALTER R. SPALDING, A.M., *Professor of Music.*
Introduction, 106 — The Chapel Choir, 108 — The Department of Music, 110 — The Pierian Sodality Orchestra, 117 — The University Glee Club, 119 — The Instrumental Clubs, 125 — Prizes, Fellowships, and other Benefactions, 127 — Codetta, 128.

THE FINE ARTS, 1874–1929 130
GEORGE H. CHASE, Ph.D., *Hudson Professor of Archaeology.*
The Norton Era, 1874–1908, 130 — New Blood, Growth, Development, 1909–1928, 135 — Research, Exploration, and the New Fogg Art Museum, 1919–1929, 141.

THE GERMANIC MUSEUM, 1903–1928 146
KUNO FRANCKE, Litt.D., *Professor of the History of German Culture, Emeritus, and Honorary Curator of the Museum.*

HISTORY, 1838–1929 150

EPHRAIM EMERTON, Ph.D., *Winn Professor of Ecclesiastical History, Emeritus.*
SAMUEL ELIOT MORISON, Ph.D., *Professor of History.*

GOVERNMENT, 1874–1929 178

ALBERT BUSHNELL HART, LL.D., *Eaton Professor of the Science of Government, Emeritus.*

Prehistoric Period, 178 — Government through History, 1874–1892, 179 — Government allied with History, 1892–1911, 181 — Period of Development, 1911–1929, 184.

ECONOMICS, 1871–1929 187

FRANK WILLIAM TAUSSIG, Litt.D., *Henry Lee Professor of Economics.*

Dunbar and the Quarterly Journal, 187 — Growth and Expansion, 1900–1928, 191 — Undergraduate Instruction, 195.

ANTHROPOLOGY, 1866–1929 202

ROLAND B. DIXON, Ph.D., *Professor of Anthropology and Curator of Ethnology in the Peabody Museum.*

The Peabody Museum, 202 — The Teaching of Anthropology, 210.

PSYCHOLOGY, 1876–1929 216

RALPH BARTON PERRY, Ph.D., *Professor of Philosophy.*

Relations of Philosophy and Psychology, 216 — The Psychological Laboratory, 217 — Instruction and Research, 220.

SOCIAL ETHICS, 1905–1929 223

JAMES FORD, Ph.D., *Associate Professor of Social Ethics.*

SEMITIC, 1880–1929 231

DAVID G. LYON, S.T.D., *Hancock Professor of Hebrew and other Oriental Languages, Emeritus.*

Instruction in Semitic Languages and History, 231 — The Semitic Museum and Exploration, 236.

EGYPTOLOGY, 1896–1928 241

GEORGE ANDREW REISNER, Ph.D., *Professor of Egyptology.*

MATHEMATICS, 1870–1928 248

JULIAN LOWELL COOLIDGE, Ph.D., *Professor of Mathematics.*

CHEMISTRY, 1865–1929 258

CHARLES LORING JACKSON, A.M., *Erving Professor of Chemistry, Emeritus.*
GREGORY PAUL BAXTER, Ph.D., *Theodore William Richards Professor of Chemistry.*

Instruction, 1865–1912, 258 — Research, 1870–1912, 263 — The Period 1912–1929, 269.

PHYSICS, 1869–1928 277

EDWIN H. HALL, LL.D., *Rumford Professor of Physics, Emeritus.*

ASTRONOMY, 1877–1927 292
SOLON I. BAILEY, S.D., *Phillips Professor of Astronomy, Emeritus.*
The Observatory, 292 — The Teaching of Astronomy and the Astronomical Laboratory, 303.

GEOLOGY AND GEOGRAPHY, 1858–1928 307
WILLIAM MORRIS DAVIS, S.D., *Sturgis-Hooper Professor of Geology, Emeritus.*
REGINALD ALDWORTH DALY, S.D., *Sturgis-Hooper Professor of Geology.*
Whitney and Shaler, 307 — The Growth of the Department, 1875–1906, 314 — From the Death of Shaler to the Present, 321.

THE GEOLOGICAL MUSEUM, 1907–1929 329
ROBERT W. SAYLES, A.B., *Research Associate in the Division of Geology.*

MINERALOGY, 1869–1928 332
CHARLES PALACHE, Ph.D., *Professor of Mineralogy.*
The Mineralogical Museum, 332 — The Department of Mineralogy and Petrography, 335.

BOTANY, 1869–1929 338
BENJAMIN LINCOLN ROBINSON, Ph.D., *Asa Gray Professor of Systematic Botany and Curator of the Gray Herbarium.*
Botanical Instruction, 338 — The Botanic Garden, 345 — The Gray Herbarium, 348 — The Arnold Arboretum, 357 — The Farlow Library and Herbarium of Cryptogamic Botany, 366 — The Botanical Museum, 370 — The Biological Laboratory and Botanic Garden in Cuba, 376.

ZOÖLOGY, 1847–1921 378
EDWARD LAURENS MARK, LL.D., *Hersey Professor of Anatomy, Emeritus.*
Agassiz and Wyman, 378 — Undergraduate and Graduate Instruction, 1874–1921, 382 — The Marine Laboratories, 392.

RECENT DEVELOPMENTS IN BIOLOGY, 1921–1928 . . . 394
G. H. PARKER, S.D., *Professor of Zoölogy and Director of the Zoölogical Laboratory.*
WILLIAM J. CROZIER, Ph.D., *Professor of General Physiology.*
Zoölogy, 394 — Physiology, 397.

THE MUSEUM OF COMPARATIVE ZOÖLOGY, 1858–1928 . 400
GEORGE RUSSELL AGASSIZ, A.B., *Overseer of Harvard College.*

ENGINEERING AND OTHER APPLIED SCIENCES IN THE HARVARD ENGINEERING SCHOOL AND ITS PREDECESSORS, 1847–1929 413
HECTOR JAMES HUGHES, A.B., *Professor of Civil Engineering and Dean of the Harvard Engineering School.*
The Lawrence Scientific School, 1847–1906, 413 — The Graduate School of Applied Science, 1906–1912, 427 — The Graduate Schools of Applied Science, 1912–1914, 431 — Coöperative Agreement with the Massachusetts Institute of Technology, 1914–1919, 433 — The Harvard Engineering School, 1919–1929, 439.

THE SCHOOLS OF ARCHITECTURE AND LANDSCAPE ARCHITECTURE, 1894–1929 443
GEORGE H. EDGELL, Ph.D., *Professor of Fine Arts and Dean of the Faculty of Architecture.*

THE GRADUATE SCHOOL OF ARTS AND SCIENCES, 1872–1929 451
CHARLES H. HASKINS, Litt.D., *Henry Charles Lea Professor of Mediaeval History and former Dean of the School.*

THE THEOLOGICAL SCHOOL, 1869–1928 463
WILLIAM WALLACE FENN, D.D., *Bussey Professor of Theology and former Dean of the School.*

THE LAW SCHOOL, 1817–1929 472
ROSCOE POUND, LL.D., *Carter Professor of General Jurisprudence and Dean of the Faculty of Law.*

Periods and Principles in the History of the School, 1817–1929, 472 — The Faculty, 477 — Teaching, 488 — Graduate Instruction and Research, 495 — The Student Body, 498 — The Library, 500 — Student Activities, 502 — Administration, 504 — Endowment and Buildings, 506.

THE BUSSEY INSTITUTION, 1871–1929 508
WILLIAM MORTON WHEELER, Ph.D., *Professor of Economic Entomology and Dean of the Institution.*

THE GRADUATE SCHOOL OF EDUCATION, 1891–1929 . . 518
HENRY W. HOLMES, Litt.D., *Professor of Education and Dean of the School.*

The Teaching of Education under the Faculty of Arts and Sciences, 1891–1920, 518 — The Graduate School of Education, 1920–1929, 527.

THE GRADUATE SCHOOL OF BUSINESS ADMINISTRATION, 1908–1929 533
WALLACE B. DONHAM, LL.B., *George F. Baker Professor of Business Economics and Dean of the School.*
ESTY FOSTER, S.B., *Assistant Dean.*

The First Decade of the School, 1908–1918, 533 — Growth and Expansion, 1919–1929, 540 — Curriculum, 541 — Faculty, Teaching Methods, and Research, 542 — Finance and Buildings, 545.

THE BLUE HILL OBSERVATORY, 1884–1929 549
ALEXANDER G. McADIE, A.M., *Abbott Lawrence Rotch Professor of Meteorology and Director of the Observatory.*

THE MEDICAL SCHOOL, 1869–1929 555
FREDERICK C. SHATTUCK, M.D., *Jackson Professor of Clinical Medicine, Emeritus.*
J. LEWIS BREMER, M.D., *Associate Professor of Histology.*

Introduction, 555 — Reformation, 1869–1883, 557 — The Boylston Street School, 1883–1906, 562 — The Move to Longwood Avenue, 569 — Growth, Activity, Service, 1906–1918, 572 — Renaissance, 1918–1929, 578 — The School and the Student, 581 — Research, 1869–1929, 589.

THE DENTAL SCHOOL, 1867–1929 595
LEROY M. S. MINER, D.M.D., *Professor of Clinical Oral Surgery and Dean of the School.*

THE SCHOOL OF PUBLIC HEALTH, 1909–1928 603
DAVID L. EDSALL, M.D., *Dean of the School.*

THE HARVARD COLLEGE LIBRARY, 1877–1928 608
WILLIAM COOLIDGE LANE, A.M., *College Librarian, Emeritus.*

From Sibley to Winsor, 608 — Accessibility, 611 — Shelf Classification, 614 — The Card Catalogue, 617 — Growth of the Library, 620 — Gore Hall and the Widener Library, 623 — Administration, 629.

INDEX 633

ILLUSTRATIONS

President Eliot, in 1904 . . . . *Frontispiece*
Chart of the Organization of Harvard University . . xxxii
Phillips Brooks, in 1885 lviii
Charles W. Eliot, in 1870 lix
President Lowell lxxxix
From the portrait by John Singer Sargent
William James 8
From the portrait by Ellen Emmet
Josiah Royce 9
George Santayana 20
From the portrait by Denman Ross
George Herbert Palmer 21
From the portrait by Charles Hopkinson
Evangelinus Apostolides Sophocles 38
William Watson Goodwin 39
George Martin Lane 50
Edward Kennard Rand 51
Francis J. Child 66
Barrett Wendell 67
George Lyman Kittredge 80
From the portrait by Charles Hopkinson
Kuno Francke 81
Irving Babbitt 92
Bliss Perry and J. D. M. Ford 93
The Department of Music, 1928 116
Three Harvard Composers: Foote, Paine, and Converse 117
Charles Eliot Norton 140
Great Hall of the New Fogg Museum 141
Henry Adams 156
The History Club in 1885 157
Charles Homer Haskins 172
Albert Bushnell Hart and William Scott Ferguson . 173
A. Lawrence Lowell, in 1896 182
William Bennett Munro and George Grafton Wilson 183

CHARLES F. DUNBAR 190
THREE HARVARD ECONOMISTS: YOUNG, CARVER, AND RIPLEY 191
CHART OF INTRODUCTORY COURSES IN HISTORY. GOVERNMENT, AND ECONOMICS 194
CHART OF INTRODUCTORY COURSES IN THE SCIENCES . . 195
FREDERIC WARD PUTMAN 210
FACULTY OF THE PEABODY MUSEUM, 1928 211
HUGO MÜNSTERBERG 222
FRANCIS GREENWOOD PEABODY 223
CRAWFORD H. TOY 234
GEORGE FOOT MOORE 235
MAXIME BÔCHER 248
BENJAMIN PEIRCE AND WILLIAM F. OSGOOD 249
JOSIAH PARSONS COOKE 260
WOLCOTT GIBBS 261
HENRY BARKER HILL 270
THEODORE WILLIAM RICHARDS 271
JOSEPH LOVERING 280
BENJAMIN OSGOOD PEIRCE 281
JOHN TROWBRIDGE 288
WALLACE CLEMENT SABINE 289
EDWARD C. PICKERING 298
CELESTIAL PHOTOGRAPH TAKEN AT THE AREQUIPA STATION . 299
ROBERT W. WILLSON 306
THREE HARVARD SCIENTISTS: SHAPLEY, BRIDGMAN, AND BIRKHOFF 307
NATHANIEL SOUTHGATE SHALER 320
JOSIAH DWIGHT WHITNEY 321
THREE HARVARD GEOLOGISTS: GRATON, MATHER, AND WARD 332
WILLIAM MORRIS DAVIS AND JOHN ELIOT WOLFF . . . 333
GEORGE LINCOLN GOODALE 348
ASA GRAY 349
CHARLES SPRAGUE SARGENT 364
From the crayon portrait by John Singer Sargent
WILLIAM G. FARLOW 365
JEFFRIES WYMAN 380
LOUIS AGASSIZ AND A GROUP OF FRIENDS 381
From plate owned by Dr. W. Milton Rose, through courtesy of J. Henry Blake

Alexander Agassiz 406
William Morton Wheeler 407
Ira Nelson Hollis 422
Three Harvard Engineers: Adams, Smyth, and Sauveur 423
Herbert Langford Warren 444
James Sturgis Pray 445
James Mills Peirce 454
Charles Loring Jackson and Frank William Taussig . 455
Christopher Columbus Langdell 478
From the portrait by Frederick P. Vinton
John Chipman Gray 479
From an etching by Otto J. Schneider
James Bradley Thayer 504
From an etching by Sidney L. Smith
James Barr Ames 505
From an etching by Otto J. Schneider
Paul H. Hanus 532
Edwin F. Gay 533
David Williams Cheever 562
Henry Pickering Bowditch 563
John Collins Warren 586
Frederick Cheever Shattuck 587
Eugene Hanes Smith 602
Walter Bradford Cannon 603
John L. Sibley 618
Archibald Cary Coolidge 619
From the portrait by Joseph A. Coletti (A.A. 1924)

INTRODUCTION

WE MEAN TO BUILD HERE SECURELY
AND SLOWLY A UNIVERSITY IN
THE LARGEST SENSE

C. W. ELIOT

1. GOVERNMENT AND ADMINISTRATION [1]

1869–1929

(1) The University

The College founded by vote of the General Court of the Colony of Massachusetts Bay on October 28, 1636, opened in the autumn of 1638, and named Harvard College in March, 1639, was incorporated May 31, 1650, by the following charter:

THE CHARTER [2]

Of the President and Fellows of Harvard College
Under the Seal of the Colony of Massachusetts Bay

Whereas, through the good hand of God, many well-devoted persons have been, and daily are, moved and stirred up to give and bestow sundry gifts, legacies, lands and revenues, for the advancement of all good literature, arts, and sciences, in Harvard College, in Cambridge, in the county of Middlesex, and to the maintenance of the President and Fellows, and for all accommodations of buildings, and all other necessary provisions that may conduce to the education of the English and Indian youth of this country in knowledge and godliness, —

It is therefore ordered and enacted by this Court and the authority thereof, that for the furthering of so good a work, and for the purposes aforesaid, from henceforth that the said College in Cambridge, in Middlesex, in New England, shall be a Corporation, consisting of seven persons, to wit, a President, five Fellows, and a Treasurer or Bursar; and that Henry Dunster shall be the first President, Samuel Mather, Samuel Danforth, Masters of Art, Jonathan Mitchell, Comfort Starr, and Samuel Eaton, Bachelors of Art, shall be the five Fellows, and Thomas Danforth to be present Treasurer, all of them being inhabitants in the Bay, and shall be the first seven persons of which the said Corporation shall consist; and that the said seven persons, or the greater number of them procuring the presence of the Overseers of the College, and by their counsel and consent, shall have power, and are hereby authorized, at any time or times, to elect a new President, Fellows, or Treasurer, so oft, and from time to time, as any of the said person or persons shall die or be removed; which said President and Fellows for the time being shall forever hereafter, in name and fact, be one body politic and corporate in law, to all intents and purposes, and shall have perpetual succession, and shall be called by the name of *President and Fellows of Harvard College*, and shall from time to time be eligible as aforesaid; and, by that name, they and their successors shall and may purchase and acquire to themselves, or take and receive upon free gift and donation, any lands, tenements, or hereditaments, within this jurisdiction of the Massachusetts Bay, not exceeding the value of five hundred pounds per annum, and any goods and sums of money whatsoever to the use and behoof of the said President, Fellows, and scholars of the said College; and also may sue and plead, or be sued and impleaded, by the name aforesaid, in all courts and places of judicature within the jurisdiction aforesaid.

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[1] Compare also President Eliot's remarks on the government of the University in his Inaugural Address (pages lxxii–lxxvii, below).

[2] Spelling and capitalization modernized. The charter will be printed *literatim* in Volume I of the History of Harvard College.

And that the said President, with any three of the Fellows, shall have power, and are hereby authorized, when they shall think fit, to make and appoint a common seal for the use of the said Corporation. And the President and Fellows, or the major part of them, from time to time, may meet and choose such officers and servants for the College, and make such allowance to them, and them also to remove, and, after death or removal, to choose such others, and to make from time to time such orders and by-laws, for the better ordering and carrying on the work of the College, as they shall think fit; *provided* the said orders be allowed by the Overseers. And also that the President and Fellows, or major part of them, with the Treasurer, shall have power to make conclusive bargains for lands and tenements, to be purchased by the said Corporation for valuable considerations.

And, for the better ordering of the government of the said College and Corporation, — Be it enacted by the authority aforesaid, that the President and three more of the Fellows shall and may from time to time, upon due warning or notice given by the President to the rest, hold a meeting for the debating and concluding of affairs concerning the profits and revenues of any lands, and disposing of their goods (provided that all the said disposings be according to the will of the donors), and for direction in all emergent occasions, execution of all orders and by-laws, and for the procuring of a general meeting of all the Overseers and Society, in great and difficult cases, and in cases of non-agreement; in all which cases aforesaid, the conclusion shall be made by the major part, the said President having a casting voice, the Overseers consenting thereunto. And that all the aforesaid transactions shall tend to and for the use and behoof of the President, Fellows, scholars, and officers of the said College, and for all accommodations of buildings, books and all other necessary provisions and furnitures as may be for the advancement and education of youth in all manner of good literature, arts, and sciences.

And, further, be it ordered by this Court and the authority thereof, that all the lands, tenements, or hereditaments, houses, or revenues, within this jurisdiction, to the aforesaid President or College appertaining, not exceeding the value of five hundred pounds per annum, shall from henceforth be freed from all civil impositions, taxes, and rates; all goods to the said Corporation, or to any scholars thereof, appertaining, shall be exempted from all manner of toll, customs, and excise whatsoever; and that the said President, Fellows, and scholars, together with the servants, and other necessary officers to the said President or College appertaining, not exceeding ten, — viz., three to the President and seven to the College belonging, — shall be exempted from all personal civil offices, military exercises or services, watchings and wardings; and such of their estates, not exceeding one hundred pounds a man, shall be free from all country taxes or rates whatsoever, and none others.

In witness whereof, the Court has caused the seal of the Colony to be hereunto affixed. Dated the one and thirtieth day of the third month, called May, anno 1650.

[L.S.] THO. DUDLEY, *Governor*

This charter was confirmed in 1780 in a section of the Constitution of Massachusetts entitled "The University," and in the text of which Harvard College is referred to as 'which University.' This seems to be the only legal sanction for that title. By custom and usage *Harvard University* has come to mean the congeries of institutions now under the authority of the President and Fellows of Harvard College. At the same time *Harvard College*, or *The College*, in common usage means the college of liberal arts, the oldest and until 1782 the only department of the University, and which provides courses of study for the degrees of Bachelor of Arts and Bachelor of Science.

The Charter of 1650 is still in force, although amended by sundry acts of the Commonwealth enlarging the Corporation's power to hold property, and defined by other acts altering the composition of the Board of Overseers. That the College Charter cannot be amended by the sovereign power — the Commonwealth — without the consent of the Corporation itself, may now be considered a settled point in American constitutional law.

Two governing boards for the University are provided by the Charter.

THE CORPORATION, whose official title is *The President and Fellows of Harvard College*, consists of the President, the Treasurer, and five other Fellows. Self-perpetuating, filling its own vacancies with the consent of the Board of Overseers, the Corporation has existed with only one break — in the Andros usurpation — since 1650. Until 1784 the five Fellows had been, with few exceptions, resident tutors or professors of the College; the Treasurer was usually a merchant. Since that date the Fellows have been, with only two exceptions, graduates of the College, but, with two or three exceptions, entirely unconnected with the teaching faculties. The President and Fellows meet fortnightly in term time, at an office which they maintain in Boston for their fiduciary transactions. There is no residence requirement for any but the President, but owing to these frequent meetings, and to the need of a fairly close contact with the University, only residents of Boston and the neighborhood were elected to the Corporation until 1912. No religious test has ever existed for membership in the Corporation; and although a majority of the Fellows have probably been Unitarians during the last hundred years, the Bishop of Massachusetts and a prominent Roman Catholic layman have recently been members.

The following list includes all members of the Corporation during the period covered by this volume, 1869–1929:

Presidents and Fellows, 1869–1929	College Class	Elected by Corporation	Resigned or *Died
John Amory Lowell	1815	Jan. 12, 1837	Jan. 8, 1877
Rev. George Putnam	1826	Feb. 17, 1853	Jan. 8, 1877
Francis B. Crowninshield	1829	June 20, 1861	*May 8, 1877
Nathaniel Silsbee, *Treasurer*	1824	Jan. 30, 1862	Jan. 31, 1876
Hon. George T. Bigelow [1]	1829	Jan. 9, 1868	*Apr. 12, 1878
Nathaniel Thayer		Jan. 9, 1868	Nov. 29, 1875
Charles W. Eliot, *President*	1853	May 11, 1869 [2]	May 19, 1909
Francis Parkman	1844	Dec. 22, 1875	Oct. 8, 1888
Edward W. Hooper, *Treasurer*	1859	Apr. 12, 1876	May 18, 1898
Hon. Martin Brimmer [3]	1849	Feb. 1, 1877	*Apr. 1, 1896
Rev. Joseph H. Thayer [4]	1850	Apr. 11, 1877	May 21, 1884
John Quincy Adams [5]	1853	July 11, 1877	*Aug. 14, 1894
Alexander Agassiz [6]	1855	June 13, 1878 Oct. 13, 1886	Oct. 24, 1884 Sept. 23, 1890
Hon. William C. Endicott [7]	1847	May 28, 1884	Sept. 24, 1895
Ephraim W. Gurney [8]	1852	Nov. 5, 1884	Sept. 12, 1886
Frederick Lothrop Ames	1854	Oct. 17, 1888	*Sept. 13, 1893
Dr. Henry P. Walcott [9]	1858	Oct. 22, 1890	Apr. 25, 1927
Henry Lee Higginson	1855	Dec. 6, 1893	*Nov. 14, 1919
Samuel Hoar	1867	Nov. 7, 1894	*Apr. 11, 1904
Hon. Francis C. Lowell	1876	Oct. 9, 1895	Mar. 6, 1911
Dr. Arthur T. Cabot	1872	Apr. 1, 1896	*Nov. 4, 1912
Charles Francis Adams,[10] *Treasurer*	1888	May 18, 1898	Feb. 25, 1929
Thomas Nelson Perkins	1891	Nov. 8, 1905 Oct. 11, 1926	Oct. 27, 1924
A. Lawrence Lowell, *President*	1877	Jan. 13, 1909 [11]	
Hon. Robert Bacon [12]	1880	Jan. 10, 1912	Jan. 7, 1918
Rt. Rev. William Lawrence,[13]	1871	Jan. 8, 1913	
John F. Moors	1883	Jan. 7, 1918	
James Byrne	1877	Nov. 8, 1920	Oct. 11, 1926
Charles P. Curtis	1914	Nov. 24, 1924	
Jeremiah Smith,[14]	1892	May 9, 1927	
Henry Lee Shattuck, *Treasurer*	1901	Feb. 25, 1929	

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[1] Chief Justice of Massachusetts, 1862–68.

[2] First elected March 12, but not then confirmed by the Overseers. Dr. Andrew P. Peabody presided at Commencement 1869; President Eliot was inaugurated Oct. 19, 1869.

[3] Mr. Brimmer had been a Fellow from 1864 to 1868. He was a founder and the first president of the Boston Museum of Fine Arts.

[4] Professor of Sacred Literature at Andover; he resigned from the Corporation on being elected Bussey Professor in the Harvard Divinity School.

[5] Brother of Henry and Brooks Adams; frequently Democratic candidate for governor, and vice-presidential candidate on the O'Connor ticket of 1872; father of C. F. Adams, '88.

[6] Curator of the Museum of Comparative Zöology at the time of his election.

[7] Justice of the Supreme Judicial Court, 1873–82; Secretary of War, 1885–89.

[8] Professor of History.

[9] Chairman of the Massachusetts State Board of Health.

[10] Resigned to become Secretary of the Navy.

[11] First attended a meeting May 19, 1909, inaugurated Oct. 6, 1909; Eaton Professor of the Science of Government at the time of his election.

[12] Secretary of State and Ambassador to France. Last attended a meeting, May 14, 1917.

[13] Bishop of Massachusetts.

[14] Commissioner General of the League of Nations for Hungary, 1924–26.

The Corporation is the principal governing board of the University, corresponding to the trustees or regents of most American universities, and to the fellows or governing bodies of English colleges. All the property of every department of the University stands in its name;[1] all departments are subject to its authority; all changes in policy or in the statutes require its consent; all degrees are granted by it; and all appointments of teachers, as well as the more important administrative officers, are made by it. The authority of the Corporation over the University is limited only by the required consent of the Board of Overseers to most of its acts, excepting financial transactions.

THE PRESIDENT. According to the University statutes, 'It is the duty of the President of the University to call meetings of the Corporation, and preside at the same; to act as the ordinary medium of communication between the Corporation and the Overseers, and between the Corporation and the Faculties; to make an annual report to the Overseers on the general condition of the University; to preside on public academic days; to preside over the several Faculties; to direct the official correspondence of the University; to acquaint himself with the state, interests, and wants of the whole institution; and to exercise a general superintendence over all its concerns. For the better discharge of these duties, he must live in Cambridge.'

Aside from these prescribed ministerial duties, the President is, strictly speaking, only the presiding officer of the Corporation. Some of Eliot's predecessors were little more, but he and his successor have been much more: energetic and positive leaders, following a definite policy during a long term of years. The President is *ex officio* head of every faculty; and the last two Presidents have seldom missed a faculty meeting. He appoints all faculty committees. As the only member of the Corporation with a close, comprehensive, and continuous knowledge of university affairs, the President naturally has an influence much beyond his voting power. A new President is deferred to in the Corporation because he has been chosen by the Fellows to run the University; and if the choice be a good one, his knowledge and competency increase with his experience. The President's relations with the Corporation, since 1869, have been intimate and confidential. In so small a body the wishes of one are necessarily shaped by the advice of all, in the give and take of informal talk; but positive convictions of a President are apt to prevail over doubts and half-formulated objections on the part of Fellows. During neither administration have the Fellows ventured to use their voting power to make an appointment over the President's head, but they have not always adopted his recommendations for appointments.

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[1] At the beginning of President Eliot's administration there were four corporations connected with the University, but not subject to the President and Fellows: the School of Mining, the Museum of Comparative Zoölogy, the Peabody Museum, and the Trustees of the Thayer Scholarships. These were formally annexed by the University in 1875, 1876, 1894, and 1898 respectively. The Harvard Economic Society (see Professor Taussig's chapter on Economics) and the Harvard Film Foundation, both of very recent creation, are separate corporations.

THE HONORABLE AND REVEREND THE BOARD OF OVERSEERS, the second governing board of the University, is older than the Corporation, having been legally established in 1642. As then constituted, it consisted of the President of the College, the Governor, Deputy-Governor and Assistants of the Colony, and the ministers of Boston, Cambridge, and four adjoining towns. During the nineteenth century, the composition of the Board of Overseers was frequently altered; but it had an organic connection with the state government and the Congregational Church until 1865. By Act of the Legislature it was then made a board of thirty, elected in six annual classes of five each, for terms of five years, by and from those holding Harvard degrees of A.B., A.M., and honorary degrees. Subsequent acts have broadened the franchise and eligibility to all holders of Harvard degrees; and an act of March 31, 1921, allows the governing boards to make rules and regulations as to time, place, and method of election. Nominations of at least double the number of vacancies are made, in the first instance, by the Directors of the Harvard Alumni Association; a preferential postal ballot is taken; other nominations may be added by petition; and the final election is made by postal ballot, at Commencement time, by all holders of Harvard degrees, except officers of the University. The President and Treasurer of the University are *ex officio* members; but the Board elects its own president and secretary.

The Board of Overseers, then, throughout the period covered by this volume, has been a body of thirty representing the Alumni of the College, and (after 1907) the Alumni of the entire University. Membership is regarded as a great honor, and is generally conferred on graduates prominent in business, finance, and alumni activities, rather than on those who have any special knowledge of education. The Board has eight regular meetings a year; and although it has contained members residing as far away as San Francisco, the attendance is faithful. The duties of the Board are largely confined to ratifying the acts of the Corporation, after discussing them with the President. Occasionally it has initiated changes as well. It works largely by committee, and also appoints Visiting Committees from outside its membership, to inspect different departments of the University. Occasionally a member of a Visiting Committee takes his duties sufficiently seriously to sit in at lectures; but the usual practice is for the Committee to dine the Department or Faculty it is inspecting, and lend a sympathetic ear to their views and wants. Many instances of the energy and devotion of Visiting Committees will be found in this volume. In 1926 the Overseers began to have members of the Student Council appear before them at their May meeting, in order to obtain the undergraduate point of view. In general, the Overseers are an important link between the University and its graduates. Individually they have included some of the most generous and constant benefactors of the University. Representing as they do graduates of some years' standing, they tend to be conservative and critical of change; while the Corporation, in close contact through the President with practical needs and problems, tends to be more radical and enterprising.

Corporation and Overseers are the governing boards of the University, the fountain of law and the final court of appeal. No account of the actual working of the University, however, could stop short with the governing boards. A large part of their authority is delegated to the faculties of the several schools, and to the deans, committees, and boards of those faculties. Formerly the respective rights and duties of these faculties, of the university officers, and of the students, were exactly determined by College Laws or University Statutes, promulgated by the Corporation and Overseers, the frequent discussion and amendment of which occupied much time and thought. When President Eliot entered into office, *The Statutes and Laws of Harvard College* constituted a formidable code of 16 chapters and 208 articles, a printed copy of which — the 'College Bible' — was given to entering students and to every officer.[1] President Eliot soon set himself to the task of obtaining a revised and simplified code, but did not succeed until January, 1877, when a new set of University Statutes in 17 articles, occupying less than five pages of the college catalogue, was adopted. These statutes were so vague and flexible, that little amendment has been necessary since. The several faculties have made and published their own rules and regulations regarding systems of instruction, the conduct of students and the like: but University legislation has been conducted since 1877 largely by standing orders of the governing boards, and of the faculties. Thus the constitution (if one may so call it) of the University is so flexible, and so largely determined by custom rather than formal enactment, that it is easy to 'get things

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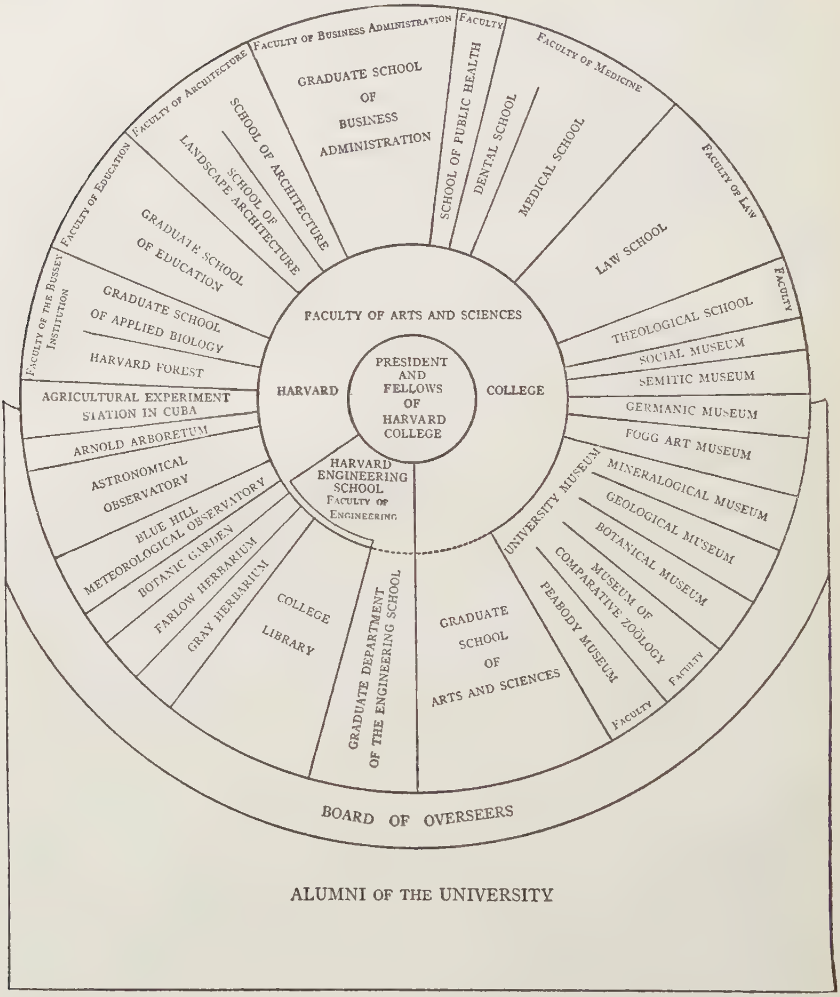
[1] The following article of the last printed edition of the College Laws (1860) is typical:

'The Library shall be properly aired and ventilated in summer, and shall be made comfortably warm in winter, during Library hours. Great care shall be taken to preserve the books from dampness and from dust. No academical exercises shall be allowed in the Library. It shall never be lighted or illuminated; nor shall an open lighted candle or lamp be carried or used in it; excepting, only, when the Librarian is obliged to seal official letters with wax, he may, with proper precautions, use a lighted taper for that purpose.'


Faculty of Business Administration
Graduate School of Business Administration
Faculty
School of Public Health
Dental School
Faculty of Medicine
Medical School
Faculty of Law
Law School
Faculty
Theological School
Social Museum
Semitic Museum
Germanic Museum
Fogg Art Museum
University Museum
Mineralogical Museum
Geological Museum
Botanical Museum
Museum of Comparative Zoölogy
Faculty
Peabody Museum
Faculty
Graduate School of Arts and Sciences
Graduate Department of the Engineering School
College Library
Gray Herbarium
Farlow Herbarium
Botanic Garden
Blue Hill Meteorological Observatory
Astronomical Observatory
Arnold Arboretum
Agricultural Experiment Station in Cuba
Harvard Forest
Graduate School of Applied Biology
Faculty of the Bussey Institution
Faculty of Education
Graduate School of Education
Faculty of Architecture
School of Landscape Architecture
School of Architecture
Faculty of Arts and Sciences
Harvard
College
President and Fellows of Harvard College
Harvard Engineering School
Faculty of Engineering
Board of Overseers
Alumni of the University

done.' The system has worked well, and despite occasional and individual grumbling there is no real desire to change it; but in the hands of an unintelligent and autocratic President, it might well be otherwise.

The Academic Council, consisting of all the professors of all the faculties of the University, administered the 'Graduate Department.' First established in 1863, to administer a system of University Lectures open to public and students alike, this Council's 'functions were obscure and its meetings infrequent' until 1872, when a new statute gave it the power to regulate the studies for, and recommend candidates for, the degrees of A.M., D.Sc., and Ph.D. In 1890 these powers were delegated to the Faculty of Arts and Sciences. The Academic Council, renamed UNIVERSITY COUNCIL, had no functions left except to discuss such matters as were of common interest to the professors of the entire University. The last important meeting was on February 28, 1913, when it was voted by a narrow majority to allow the Medical School to admit students not Bachelors of Arts. There have been only two meetings since, both on the subject of pensions.

For some years before 1869, the tendency of the University was centrifugal; the Law, Medical, and Dental Schools were practically independent, even financially. President Eliot brought about a strict centralization of financial control, although the identity of the several hundred funds for individual schools or special purposes was religiously preserved. By working through the several faculties, President Eliot extended his reforming influence throughout the University, bringing the parts into much closer coördination. Having effected this purpose, in about fifteen years' time, he left the professional schools much to their own devices, and they have since enjoyed a very large degree of autonomy. But they must convert Corporation and Overseers to any desired reform, and obtain their consent to all appointments.

The actual composition of Harvard University may best be grasped by the accompanying chart, representing the President and Fellows (the Corporation) as the hub of a huge wheel. The inner circle consists of Harvard College and the Harvard Engineering School, under their separate Faculties. Outside them revolve the graduate departments, the University Library, the museums and research institutions, each with its separate faculty or council or board — excepting that the Graduate School of Arts and Sciences is controlled by the Faculty of Arts and Sciences, and the graduate department of the Engineering School by the Faculty of that School. The entire wheel is braked by the Board of Overseers, and greased by the great body of Alumni.

(2) HARVARD COLLEGE

The administrative problems of the several graduate and professional schools are treated in the appropriate chapters, but the administrative development in Harvard College, and the changing systems of instruction and examination, touching as they do all the branches of learning taught in the College, deserve further treatment here.

In 1869 the President, Steward, Regent, and Registrar were the only administrative officers of the College. A statute of January, 1870, created the office of Dean of the College Faculty and defined his duties, relieving the President of much formal administrative work.

The following men were Deans of the College Faculty until the administrative reorganization of 1891:

Ephraim W. Gurney, Professor of History, 1870–76.
Charles F. Dunbar, Professor of Political Economy, 1876–82.
Clement L. Smith, Professor of Latin, 1882–90.

The COLLEGE FACULTY, including all the College (as distinct from University) officers of instruction appointed for a term of over one year, and numbering but twenty-three in 1869, controlled the system of instruction, drew up the annual list of courses, made rules and regulations for the conduct and the studies of undergraduates, recommended for the degree of A.B., and dealt with each individual infraction of discipline. Similar powers were enjoyed by the Faculty of the Lawrence Scientific School. Appointment and promotion rested with the governing boards, and President Eliot did more or less 'hiring and firing' in his early years. In his report for 1872–73 the President announced that for the last two years he had established the practice of formally consulting professors concerning appointments and promotions in their respective departments. According to the memory of the older professors, however, this practice was informal, and consisted in the President's receiving suggestions from, or consulting informally, Gurney or Dunbar or some other professor whose judgment he respected.

In 1889–91 there was a complete administrative reorganization and partial amalgamation of the College, the Lawrence Scientific School, and the Graduate Department. In view of the development of the elective system, no hard and fast line could any longer be drawn between courses in arts and in sciences, or between courses for undergraduates and graduates. Hence a closer coördination was necessary. The College Faculty held forty-two meetings in the year 1889–90, with frequent references to and from the governing boards. The outcome was a statute of May 21, 1890, combining the faculties of the two undergraduate schools in the FACULTY OF ARTS AND SCIENCES.

Even the College Faculty, with sixty-six members, had grown too large to deal effectively with cases of individual discipline and the large variety of business that came before it. Hence a large part of the power of the new and growing Faculty of Arts and Sciences was delegated to the three Administrative Boards (for College, Scientific School, and Graduate School), and to eleven standing committees.[1] In University Hall the old College Chapel, which had been cut up into numerous apartments since Appleton Chapel was built in 1858, was restored to its original condition in 1896, and became the Faculty Room; the President's office remained much as before; the Dean and Recorder of Harvard College were given a part of what had once been the dining hall on the ground floor. Administrative offices gradually took over the whole of University Hall.

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[1] On Instruction, Admission, Fellowships, Special Students, Public Entertainments, Freshmen Advisers, etc. The Faculty of Arts and Sciences was at first no larger than the College Faculty, since all or practically all the teachers of the Lawrence Scientific School were also members of the College Faculty; but it grew rapidly: to 113 in 1900, 169 in 1910, and 253 in 1928.

'U. 4,' the headquarters of the College Dean, will long be associated with the first incumbent in that office, LeBaron Russell Briggs. He performed the miracle of exercising a personal influence on a large and increasing student body. The humanity, perception, and kindly humor, which enliven his printed reports, were so evident to the undergraduates that it is said men used deliberately to 'get in trouble with the office' in order to talk with the Dean. In 1902 Briggs became Dean of the Faculty of Arts and Sciences, in succession to Professors Dunbar (1890–95), J. M. Peirce (1895–98), and C. L. Smith (1898–1902), and held that position for twenty-three years, yet keeping in touch with the undergraduate body through his membership on the Committee on Athletics. His successors as deans of Harvard College were Professors B. S. Hurlbut (1902–16), H. A. Yeomans (1916–21), C. N. Greenough (1921–27),[1] and A. C. Hanford (1927–).

'The next interesting subject which engaged the attention of the Faculty was the organization of twelve standing committees of the Faculty, called Divisions,'[2] including all the members in one broad field of study. Each division was given control over granting honors and administering the higher degrees that came within its sphere of instruction. Most of the divisions were subdivided into departments. Most of these departments had already existed many years, and at least two, the Classics and History, already had special departmental libraries; but few if any seem to have had regular meetings or to have kept records, before 1891. Since that date, each department — consisting of all faculty members in that branch, with short-time appointees or even assistants attending without voting — has been a lively centre of activity, issuing special pamphlets of its courses, discussing and arranging course programmes, planning assaults on the Corporation for more money, administering departmental libraries, buying equipment, and usually taking the initiative in promotion and appointment. Unlike most American universities, the departments at Harvard since 1891 have had chairmen but not heads, presiding officers but not rulers, unless by force of personality; and the office rotates frequently. Chairmen of departments and divisions are appointed by a committee of the President and Deans.

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[1] Also Acting Dean, 1919–21.

[2] President's *Report*, 1890–91, p. 11. Since increased to fourteen by the split of Natural History into Geology and Biology, and the addition of Medical Sciences.

The following list shows the divisions and departments with their chairmen, in 1929:

DIVISIONS AND DEPARTMENTS OF THE FACULTY OF ARTS AND SCIENCES

SEMITIC LANGUAGES AND HISTORY. Professor Jewett, chairman.
ANCIENT LANGUAGES. Professor Gulick, chairman.
  A. *Indic Philology.* Professor W. E. Clark, chairman.
  B. *The Classics* (*Greek*, *Latin*). Professor C. N. Jackson, chairman.
MODERN LANGUAGES. Professor Grandgent, chairman.
  A. *English.* Associate Professor Murray, chairman.
  B. *Germanic Languages and Literatures.* Assistant Professor Starck, chairman.
  C. *Romance Languages and Literatures.* Professor Ford, chairman.
  D. *Comparative Literature.* Professor Kittredge, chairman.
THE FINE ARTS. Professor G. H. Chase, chairman.
MUSIC. Professor Hill, chairman.
MATHEMATICS. Professor J. L. Coolidge, chairman.
PHYSICAL SCIENCES. Professor Pierce, chairman.
  A. *Physics.* Professor Saunders, chairman.
  B. *Engineering Sciences.* Professor Hughes, chairman.
CHEMISTRY. Professor Baxter, chairman.
BIOLOGY. Professor Ames, chairman.
  A. *Botany.* Associate Professor W. H. Weston, chairman.
  B. *Zoölogy.* Associate Professor H. W. Rand, chairman.
  C. *Physiology.* Professor Crozier, chairman.
GEOLOGY. Professor Palache, chairman.
  A. *Geology and Geography.* Professor Mather, chairman.
  B. *Mineralogy and Petrography.* Professor Palache, chairman.
HISTORY, GOVERNMENT, AND ECONOMICS. Professor Carver, chairman.
  A. *History.* Professor Schlesinger, chairman.
  B. *Government.* Professor Holcombe, chairman.
  C. *Economics.* Professor Burbank, chairman.
ANTHROPOLOGY. Professor Tozzer, chairman.
PHILOSOPHY. Associate Professor Lewis, chairman.
  A. *Philosophy and Psychology.* Associate Professor Lewis, chairman.
  B. *Social Ethics.* Professor Cabot, chairman.
MEDICAL SCIENCES. Professor Reid Hunt, chairman.[1]

Until about 1910 the Faculty of Arts and Sciences was a deliberative body, on all aspects of University policy save those peculiarly pertaining to the professional schools; although it had final power to decide in minor matters only. President Eliot's favorite method of coming to a decision on some question of policy was to toss it into the Faculty for debate. Since 1910, the two Administrative Boards (College and Graduate School), the Deans, the Departments, and the Committee on Instruction have progressively absorbed most of the Faculty's functions, so that business comes before it in a well-digested form, and seldom arouses debate. The meetings have declined in number for want of business, and attendance has fallen off for want of interest. The Faculty is tending to become — in the writer's opinion it has already become — a mere registering body.

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[1] This is not a real Division of the Faculty of Arts and Sciences, but a group of Medical School courses which are open under certain conditions to members of the Graduate School of Arts and Sciences. What are generally called pre-medical courses in most universities are here included under Chemistry, Physics, and Biology.

The Committee on Instruction, composed of chairmen of all departments under the Faculty of Arts and Sciences, with Professor Clifford H. Moore as chairman of the chairmen, came into existence in 1917–18,[1] in order to make quick changes necessitated by the war. Like many wartime institutions in the political world, it has proved to be a useful instrument in time of peace. Its power was enhanced in 1925 when the chairman became also Dean of the Faculty of Arts and Sciences; the Dean is now *ex officio* chairman of the committee. The Committee on Instruction considers and consolidates the annual list of courses prepared by the several departments, discusses questions of educational policy, and in general predigests business for the Faculty.

It may be said that things get done in Harvard College by a series of persuasions, or do not get done by a series of dissuasions. The 'reading period,'[2] for instance, began with a certain professor. It was first discussed and amended in his department, then in the Division of which that department formed a part, with at least two references to the Tutors and the Committee on Instruction, by which it was put in so acceptable a form that it passed the Faculty of Arts and Sciences *nem. con.*, and was finally adopted by the Corporation with the consent of the Overseers; the whole process taking only a few months.

Teaching appointments and promotions are now commonly initiated by a committee of professors in each department, after consultation with the Dean, then submitted to the Dean, who, if he approves, transmits the nomination to the President. The President in his turn, if approving, recommends to the governing boards. There is much informal consultation all around while the formal steps are being taken. At times the President or Dean makes the first suggestion of a promotion, and occasionally of a new appointment; but a department would have to be in a very bad way before the Corporation would make a new appointment against their wishes. It should be said that the practice of making a specific 'contract' with a teacher has never been adopted at Harvard. Every appointee to a teaching position, unless relieved by special vote of the Corporation, is expected to carry his share of the teaching duties in his department; but the practice differs somewhat from one department to another as to the number and kind of courses for a 'full load.'

Disciplinary contact with the students of the College is maintained (1) by a Regent, who acts as chairman of a Parietal Board including the proctors of the several residential halls; (2) by the Dean of the College and assistant deans who are appointed from recent graduates;[1] and (3) by the Committee on the Regulation of Athletic Sports which, as reorganized in 1908, consists of four Faculty members (including the Director of Athletics) and three graduate members appointed by the Corporation, and three undergraduates chosen annually by a sort of sporting electoral college. Since 1908 there has been a Student Council, consisting (as reorganized in 1923–24) of seven Seniors and three Juniors, elected by their respective classes, and who themselves coöpt five more. The Student Council discusses, sometimes in conference with College officials, matters of policy affecting the undergraduates; it handles the budget for student activities, such as Phillips Brooks House, and issues an annual report. 'Student self-government' in the usual American sense, meaning the regulation of manners and customs by student committees or meetings, does not exist in Harvard College.

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[1] There had been an earlier committee of the same name, but it did little except to read proof of announcements of courses.

[2] See below, page l.

The government of Harvard University is *sui generis*. Broadly speaking, the professional schools and museums of the University are governed by their Deans or Directors, with more or less help from their Faculties, Councils, or Administrative Boards; but the government of Harvard College eludes any descriptive title invented for political societies. In some respects it resembles a benevolent despotism, and the tendency of recent years has been in that direction; yet the yoke is light, since the jurisdiction is limited by the principle of academic freedom. Individual members of the teaching faculties have full control over and responsibility for their methods of teaching; orders or even suggestions on that subject from administrative officers would be deemed impertinent and improper. Collectively, by departments, the professors have a principal say in the choice of colleagues, and in subjects to be taught. Hence they tend to regard administrative centralization as a relief to them, rather than a usurpation. The President and Fellows certainly would not impose any important change without consulting the appropriate Faculty or its representatives and obtaining their consent; although they may refuse consent to measures that the Faculty desires, or decline to appoint men recommended by a department.[2] They have, of course, complete control of the finances of the University; but this control has never been used improperly, and the Corporation cheerfully supports subjects whose value they doubt, as well as professors whose doctrines they disapprove.

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[1] The first assistant deans, or 'baby deans' as the students called them, were Clarence C. Little and Lawrence S. Mayo of the Class of 1910, appointed in 1916.

[2] See President Lowell's statement regarding the government of the University, in his *Report* for 1919–20, pp. 21–25.

2. COLLEGE STUDIES, 1869–1929

The chapters on the principal branches of study in Harvard College and the Graduate School presuppose familiarity with the system of instruction known as the course system or the elective system, which received their most complete, though not their earliest, application at Harvard under President Eliot.[1] For those not familiar with the workings of American universities it may be well at once to make a definition of terms, and then briefly to narrate the history of the development of this system of instruction in Harvard College since 1869.

Courses. The term *course*, as used throughout this work, means a unit of instruction in which the instructor meets his students for two or three hours a week for a lecture, recitation, or discussion, assigns prescribed reading, laboratory or field work, or written work such as essays, reports and theses, or a combination of these; examines them at stated intervals on the subject of the lectures *and* the assigned study; and finally assigns a grade — on the percentage scale before 1886, on a lettered scale since.[2] A full course extends throughout the college year; a half-course through one of the two terms, or half-years as they are generally called.[3] Undergraduates must take not less than four, nor more than six courses a year (counting two half-courses as one course). From the beginning of this period until 1917 the A.B. and S.B. degrees were granted for having obtained satisfactory grades in a certain number of courses, varying according to the degree of pre-college preparation, the time consumed being normally four years.[4]

Since 1890 the courses in the catalogue have been divided into three grades of ascending difficulty: 'courses primarily for undergraduates,

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[1] Deferring discussion of the origin of the Elective System to a subsequent volume, I can, however, state here that it was not invented at Harvard or by President Eliot, — he never claimed it was, — although the very wide application that it received in the Harvard of his day doubtless encouraged its general adoption throughout the United States.

[2] A (theoretically above 90 per cent), B (above 75 or 80), C (above 60), D (above 50), E and sometimes F, failure.

[3] There are still a few half-courses meeting once a week, extending throughout the year, and some advanced courses meet once a week for two hours. The Academic Year begins 'on the Monday preceding the last Wednesday in September' and ends at Commencement, 'the Thursday preceding the last Wednesday in June' — dates that have been very slightly altered since 1870. Each half-year consists of thirteen weeks when courses are in full swing, ten days' recess at Christmas and one week in April, about two weeks of 'reading period' when the meetings of all but elementary and introductory courses are suspended, and two and a half weeks of midyear or final examinations.

[4] For the requirements for the A.M., see Professor Haskins's chapter on the Graduate School of Arts and Sciences, in this volume.

(lower group), 'courses for undergraduates and graduates' (middle group), and 'courses primarily for graduates' (upper group). The last includes all research, seminar, and '20' courses. These '20' courses,[1] frequently referred to in this volume, are a device for defeating the rigidity of the course system. They amount to tutoring with, or writing a dissertation under the supervision of, a single instructor; and may consume a student's entire time. Undergraduates are allowed to take a '20' course only by exception. *Course* is also used at Harvard in the sense of a student's chosen curriculum, although a more common term for this is *programme*. In the Engineering School, for instance, courses are arranged in a number of definite programmes, looking toward science degrees in specified subjects.

Class, in American university language, means the persons who enter college the same year, and presumably graduate at the same time.[2] The four classes in college are called Freshmen, Sophomores, Juniors (originally Junior Sophisters), and Seniors (originally Senior Sophisters). The two last are the *upperclassmen*. Before as well as after graduating a class is identified by its baccalaureate year. Thus, during the academic year 1929–30, the Classes of 1930, 1931, 1932, and 1933 are in College. The class has been a strong social bond at Harvard from the earliest days to recent times, and is the unit of alumni organization — each class meeting after graduation for periodic reunions and vying with other classes in generosity to the University. The class was also a unit for instruction — like a grade, class, or form in a secondary school — until President Eliot's administration.

'Class' is also used, at Harvard, for the students in an individual course; but is never used to indicate a grade in academic honors.

The classes in the Law, Medical and other professional schools excepting the Theological School, are called simply first-year men, second-year men, etc. With that exception, the terms Junior, Senior, etc., have a purely undergraduate connotation.

Officers of instruction are Professors, Associate Professors, Assistant Professors, Lecturers, Instructors, and Assistants. The tenure of Professors (often, though inaccurately, called *full* professors) and of Associate Professors is unlimited, subject to the provision of retiring allowances that they may retire at 60, and may be retired at 66 by the President and Fellows. Assistant Professors are ordinarily appointed for a term of three years. Many professorial chairs at Harvard in comparison with most other American universities, but few in comparison with English universities, are provided by special foundations. The income of these foundations is in most cases inadequate for the present scale of salaries. When a new professorship is wanted, the salary is provided out of the general funds of the University; or, if the Corporation are favorable to the office while unequal to the financial requirements, the sum required is underwritten, for a term of years, by private benefactors.

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[1] These are sometimes announced with a title — such as Romance Philology 20 (Studies in the Works of Foscolo), Fine Arts 20p (History of Chinese and Japanese Art); sometimes as 'topics' in certain subjects, such as History 20h (Latin America); sometimes the instructor alone is listed, as 'English 20j. Professor Rollins.'

[2] A student who enters Harvard with advanced standing from another college is at first 'unclassified,' then assigned to the Sophomore, Junior, or Senior class according to his proficiency. A student who receives his A.B. in three or in more than four years is nevertheless listed, in the catalogue of graduates, with his *classmates*, the men with whom he would normally have graduated. In such cases the actual year of getting his degree is entered in parentheses after his name.

Lecturers are short-time appointees, having special duties and a salary by special arrangement. They do not necessarily conduct their courses by lectures.

Tutors. Until 1914 a tutor was simply the lowest grade of instructor. He might hear recitations on a set book, or even lecture; tutoring he never did. Very few tutors were appointed after 1878, and between 1904 and 1914 there were none. Then the office was revived for its original function of helping individual students, and for the immediate purpose of preparing them for the new General Examinations at the end of Senior year. A tutor may have the title and emoluments of any academic grade, including professor; the name implies a function and not a rank.

Beginning with the college year 1869–70, professors' salaries were raised from $3000 to $4000, assistant professors' to $2000, while the tutor's salary remained $1000. During the fifty years following, the trend was very slightly upward, as may be seen from the scale for 1918–19. The great endowment drive undertaken by the Alumni in 1919 made possible a considerable increase. There has been a slight increase during the last ten years, and another is pending.[1]

The origin of the system of instruction in Harvard College is the graded school, and for almost two centuries the four classes followed a rigidly prescribed course of studies. In 1825 this system began gradually to be replaced by more or less options, or *electives* as they were called here; and the *elective system* began to develop with not infrequent setbacks. President Eliot considered some regulations of 1865 reducing the prescribed and increasing the elective studies, to be the

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[1] Salary scale of full-time members of the Faculty of Arts and Sciences:

	1918–19	1919–20	1928–29
Professor	$4000–5500	$6000–8000	$6000–9000
Associate Professor	3500	5000–5500	5250–5750
Assistant Professor	2500–3000	3500–4500	3500–5000
Instructor	1000–2000	1600–2750	1800–2750

These figures do not apply to salaries in most of the graduate schools.

'final and resolute stride' of the Faculty upon 'a road which they have steadily followed ever since.'[1] He made the abolition of prescribed studies, and the enrichment of the elective programme, one of his primary aims; and fully accomplished his purpose. President Lowell's administration has been marked by an important modification of the student's liberty of choice, and an attempt to turn the student mind toward studying a subject rather than taking courses. But the free elective system still remains the basis of instruction for the bachelor's degree.

In 1868–69, the last year of President Hill, all the studies of the Freshman year were prescribed. Freshmen studied Greek, Latin, Mathematics, French, and Elocution throughout the year, and Ethics the first term. Sophomores were required to take Chemistry and German throughout the year, and Ancient History and Philosophy for one term each. In addition they must choose at least 'eight hours a week' (three courses) of electives from a list composed of Latin, Greek, Italian, Anglo-Saxon, and Mathematics. Juniors were required to take Philosophy and Physics throughout the year, and to choose two or three elective studies from a list composed of the above, with Chemistry, German, and Natural History. Spanish and Italian could be taken as extra subjects without credit, but must be so taken if the student wished to take the Senior courses in those languages — an obvious attempt to discourage these studies. Seniors were required to take History, Philosophy, and Ethics, and to choose two or three electives from a list similar to the Junior one. Each class, in addition, had required English themes or forensics, and Latin and Greek exercises.

It is to be noted that the term *course* had not yet been introduced, although the thing was there; one spoke of Freshman Studies and Senior Studies, Sophomore Greek and Junior German. Further, each course or study was rigidly attached to a certain class. A Freshman might have been brought up in France, but he could not escape Otto's Grammar. An ambitious Greek scholar must read the Olynthiacs his Sophomore year, or give up Greek; nor was the boy who had had eight years of Latin at school permitted under any circumstances to taste the joys of Juvenal before his Senior year. Spanish could not even be begun before Junior year.

Bit by bit the required studies or courses became electives, and these were greatly increased in number and in scope, until in 1874–75 President Eliot could announce that all required studies were now in Freshman year, except a few odd bits of Rhetoric, History, Philosophy, and

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[1] President Eliot's *Report* for 1883–84, p. 21. This report contains the best available history of the elective system to that date. See also the first part of his Inaugural Address (pages lix–lxii, below).

Political Economy. In 1870–71, for the first time, the courses were numbered (History 1, 2, 3, etc.) and arranged in the catalogue by departments, instead of being attached to the four classes; so that from the end of Freshman year a student could study almost anything on the list, except that an introductory course in any subject must precede a more advanced one. That restriction on free choice has always held, even when the elective system reached its zenith. Conflicts of hours also hindered an absolutely free choice, although the system of examination groups, invented by Professor Macvane in 1878, brought some relief.[1]

In his Report for 1879–80 the President announced that 'the recitation, considered as an opportunity of examining a student to see whether he has learned the lesson of the day, and to give him a mark . . . has well-nigh disappeared.' Lecture courses without reading, lecture courses with parallel reading, lectures 'with a large admixture of the Socratic method,' 'conversational instruction,' and recitations combined with discussion by the class and comment by the instructor, had replaced the school-boy methods in vogue in 1869. Some lecturers dictated from manuscript, others lectured fast, without notes; some furnished syllabi or even printed notes; some required outside reading, others merely suggested books to read but examined on their own lectures. Yet every course counted equally for academic credit.

In 1881 came the division into courses and half-courses. The latter have since gained steadily on the former, increasing almost to infinity the possible programmes of study.

With the extension of the elective system to the Freshman year, in 1883–84, the President announced the 'practical completion of a development which began sixty years ago.' There were now no required courses save Freshman English and German (or French), Sophomore and Junior themes and forensics, and two easy half-year lecture courses, one on Chemistry and one on Physics. Even these could be 'anticipated' or worked off at school by taking extra entrance examinations in those subjects. Even without such anticipation, the A.B. degree could be earned by passing 18.4 courses, one-quarter of them with a grade of C or better[2] — until 1893–94, when half the grades must be C or better. Some heretic had evidently suggested the advisability of requiring some connected or rational selection of studies; for the President declared briskly: 'To fetter this spontaneous diversity of choice . . . by insisting that studies shall be taken in certain mixtures or groups . . . is as unnatural as it is unnecessary. . . . Groups are like ready-made clothing, cut in regular sizes: they never fit any concrete individual.'[1] Still, the administration admitted that freedom in the choice of studies could not go much farther. For the past twenty years the College Faculty had been watching and fostering the growth of the elective system; 'for the next few years our problem will be to devise and apply such checks and regulations as experience has shown to be needed.'[2]

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[1] The examination group system, which still prevails, consists in distributing the meetings of the courses among the available hours of the morning and afternoon, so that the mid-year and final examinations of all the courses occurring at any one hour (such as Monday, Wednesday, and Friday at 10) come on the same morning or afternoon; and in general, no student will have more than one examination on a single day. The standard length for mid-year and final examinations is three hours.

[2] The four-tenths represented the prescribed Chemistry and Physics. Students could not idle along until Senior year, and then collect their 'C's'; one-quarter of the courses each year had to be passed with that grade in order to be promoted to the next class, and escape 'probation.'

For a few years past, Juniors and Seniors in good standing had been exempted from required attendance at lectures in their courses. As compulsory chapel ended in the spring of 1886, the Faculty believed that some new check was needed, and adopted the system of 'discretionary supervision' still in vogue. Good students were allowed to cut classes frequently — but these seldom did; poor students were held up to a regular attendance by the bogy of 'probation,' a state which precluded participation in athletics, theatricals, and concerts. Even with strict attendance taken, the term-time exodus from Cambridge was so alarming that the Faculty were at some pains to resist a demand of the Overseers for a morning roll-call. Registration at the beginning and end of vacation, and more frequent written tests in lecture courses, answered the purpose of keeping the students at Cambridge, if not at work. 'Work' was the great faculty slogan of this period. The ideal student was the one who 'worked' six hours a week for every course he took. How or at what he worked was a secondary consideration. Another slogan was 'opportunity with responsibility.' All students welcomed the one, but most were quite willing to have the Faculty shoulder the other.

For some years the President and Faculty had evinced some alarm at the rising average age of Freshmen at entrance — it had passed 18 in 1860, and risen to 19 in 1882 and 1883.[3] At the same time the graduate schools of Law and Medicine were clamoring to have the normal course for the bachelor's degree reduced to three years, so that the average Harvard graduate could begin his professional studies a year earlier. A considerable number of students already earned their A.B. in three years, both by 'anticipating' Freshman and other prescribed studies in their entrance examinations, and by taking more courses than were absolutely necessary each year.[1] It was the general practice of students to take extra courses as 'insurance,' so that if they 'flunked' one or two they would still be promoted; and if by good luck they passed all, there would remain so much less to do Senior year. Investigation showed that some ambitious youths took as many a seven or eight courses in one year. The effect of keeping so many different studies going at once, even nominally, may well be imagined. Yet this process was encouraged, in 1891, by a Faculty vote allowing students to 'count' courses taken in the Summer School. 'We continue to feed the unpromising notion that College studies are to be counted off as rapidly as possible,' wrote Dean Briggs in 1899.[2]

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[1] *Report* for 1884–85, p. 45.

[2] Dean Smith, in President's *Report* for 1885–86, p. 69.

[3] President's *Report* for 1884–85, p. 188. The average age of the Class of 1932 when entering Freshmen was 18.29.

The Faculty was never wholly converted to the three-year movement, but, perhaps unconsciously, aided it in several ways. Prescribed Physics and Chemistry were dropped in 1890 and 1894, respectively. In 1897–98 disappeared the last vestige of the old Sophomore themes and Junior forensics; so that of the Class of 1903 only 17½ courses were required for graduation; only 17 if they got a C in Freshman English, only 16 if they 'anticipated' prescribed Freshman English; even less if they got extra 'points' in the entrance examination. In 1903 it was provided that a student who earned his A.B. in three years could have it granted then, but have his name entered in the catalogue of graduates under the class with which he entered. At that point both Faculty and Overseers dug in their heels, and refused to reduce the requirements for the A.B. so that the *average* student could earn it in three years.[3] The top of the curve was reached with the Class of 1906, in which 153 students (36 per cent) graduated in three years. Only ten members of the Class of 1928 did so.

A Faculty Report of 1899–1900 showed that the percentage of students who elected little or nothing but elementary courses was as high as 55 per cent in the class of 1898; and that the percentage of those who took at least half their courses in one department was never higher than 28 per cent. The tide began to turn. Two-thirds of one's courses were required to be passed with a grade of C or better in 1901–02. And in the autumn of 1903 the pure elective system had a bombshell exploded under it in the shape of a Report of the Faculty Committee on Improving Instruction, largely written by Professor A. Lawrence Lowell.[4]

[1] In the class of 1894, for instance, 18 out of 348 graduated in three years, 11 more had leave to enter a graduate school Senior year, with a course or two to make up in College; and 48 more had 16 or more courses to their credit at the end of Junior year. This last class of men was a problem, for they had to take four courses Senior year, but only needed to *pass* one or two.

[2] President's *Report* for 1897–98, p. 116.

[3] President Eliot gives the history of the three-year movement in his *Reports* for 1901–02, p. 25, and for 1907–08, pp. 14–18; statistics in *Report* for 1912–13, p. 9.

[4] The full report is printed in the *Harvard Graduates' Magazine*, xii, 611–620.

This committee sent out questionnaires to undergraduates about their studies and their courses, and received 1757 replies, which revealed a surprising state of affairs. It was commonly supposed that the average 'work' required for each course was six hours a week. The students' replies showed that the average done was 3½ hours; 2½ hours for large lecture courses. Courses were chosen haphazardly, with little regard to their content: their reputed 'softness' or convenient hours being a primary consideration. Undergraduates regarded certain subjects, such as History, Economics, the Modern Languages, as cultural, and others, especially the Classics, Mathematics, and the Sciences, as professional, only fit for 'greasy grinds' and future teachers, doctors, or chemists. The committee declared that 'in the College today there is too much teaching and too little studying,' that the effort to count off courses and get through in three years made for perfunctory study. 'The fact that ambitious students find little incentive to take honors[1] is one of the glaring failures of our system.' They advised that something be done to encourage honors at graduation, and make them more than a scholastic distinction for young specialists.

The immediate results of this Report were three. (1) Notoriously easy courses were stiffened up.[2] (2) An additional tuition charge for all courses taken over four, which discouraged rushing through in three years. (3) New regulations for the degree of A.B. 'with distinction,' which made honors at graduation both honorable and desirable, and encouraged a grouping of courses which was the beginning of a new era.

These Degree with Distinction regulations first went into effect for the Class of 1908, and have been little changed in twenty years.[3] The essence of them was the performance of work of superior quality in some one branch of learning, generally comprised by a Department or Division. Each Department or Division made its own regulations. In general these required (*a*) the passing of eight courses in the Department with distinction (A or B), (*b*) the submission of a thesis, (*c*) the passing of an oral examination near the end of the Senior year in all the courses taken in the field for distinction. Bachelor's degrees *cum laude*, *magna cum laude*, and *summa cum laude*, formerly awarded for percentages or grades in course work alone, were henceforth given on the basis of these three factors.[1] An attractive bait was thrown out for distinction candidates. Such men, at the beginning of Sophomore year could be placed on the Dean's List, which exempted them from required attendance at lectures. They remained on the Dean's List as long as their course work remained of good quality; and they were exempted from final examinations Senior year on the courses in their distinction field, if their showing in the general examination proved satisfactory.

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[1] Honors were of two kinds: (1) the A.B. was conferred *cum laude*, *magna cum laude*, or *summa cum laude*, for getting a specified minimum of A and B grades. (2) Second-year honors and final honors in a subject were conferred for high grades, plus an oral examination in the courses already covered. These distinctions were not even entered in the Quinquennial Catalogue of Graduates until 1915.

[2] Note the significant drop in the registration of Geology 4 and History 1 in the graphs facing page 196.

[3] Since 1927–28, however, they have been called Degrees with Honors.

In addition to departmental fields for distinction, a number of 'special fields' were created, of which History and Literature was noteworthy because the candidates were questioned *viva voce* without reference to the courses they had taken.[2]

President Eliot accepted these reforms with good grace. But he must have seen that a new generation had grown up in the Faculty which regarded the pure elective system, that he had so laboriously built up, as wanting many features of a liberal education.

On October 26, 1908, President Eliot resigned, the resignation to take effect on May 19, 1909, the fortieth anniversary of his election. Professor A. Lawrence Lowell, a leader of the new movement, was elected to the Presidency. In his last annual Report, for 1907–08, President Eliot pled for a frank adoption of a three years' programme for the A.B., in order to save the College. President Lowell, in his inaugural address, declared, 'The most vital measure for saving the College is not to shorten its duration, but to ensure that it shall be worth saving.'[3]

No time was lost in modifying the elective system for all undergraduates, distinction candidates and others. Early in 1910 the Faculty and the Governing Boards adopted, to go into effect for the Class of 1914, the system of 'Concentration and Distribution.'[4] This regulation required every undergraduate to concentrate at least six of his sixteen elective courses in one Division, or recognized field for distinction (such as History and Literature); and to distribute at least six of his other courses among the three general groups outside his concentration.[5] 'The object to be attained was two-fold,' wrote President

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[1] Distinction could, however, be obtained also by the old system for a number of years; and even in 1929 a student can obtain *cum laude* automatically by nine A's or B's.

[2] See pages 173–175, below.

[3] The Inaugural Address, which is the key to President Lowell's administration, is printed below, as pages lxxix–lxxxviii of this Introduction.

[4] Already in force in many American universities under the title 'majoring and minoring.'

[5] The four groups established for purposes of distribution were (1) Languages, Literatures, Fine Arts, Music; (2) Natural Sciences; (3) History, Government, Economics, Education, and Anthropology; (4) Philosophy and Mathematics. Distribution requirements have gradually become less drastic. In 1928–29 they were reduced to four

Lowell. 'First, to require every student to make a choice of electives that will secure a systematic education, based on the principle of knowing a little of everything and something well. . . . Second, . . . to make the student plan his college curriculum seriously, and plan it as a whole.' [1]

The next reform, adopted in 1909–10, was the requirement that no student be promoted to the Junior Class until he had proved his ability by a special examination to read ordinary French or German.[2] The object was to enable students to use foreign languages as instruments in their higher courses. These examinations, however, were generally regarded as ends in themselves, to be 'worked off' as early as possible; and the setting of reading in French or German in a course on History or Philosophy seems to arouse the same dismay that it did twenty years ago.

Next, and most important of the reforms so far of the Lowell administration, were the General or Divisional Examinations and the Tutorial System. It was observed that 'concentration' would mean little to the undergraduate so long as it meant merely taking six courses in one field; he must have something to concentrate on. Yet the requirement for the bachelor's degree of anything besides passing courses seemed so revolutionary, that the Faculty and the Governing Boards wisely left any further step in this direction optional with each Division. Mr. Lowell's former Division of History, Government, and Economics took the initiative in 1912, by requiring of all concentrators (not merely honors candidates) in that Division, beginning with the Class of 1917, a general examination upon the field of their concentration.

Frankly modelled on the Honour Schools of Oxford, these general examinations are set and graded by a special board of examiners, appointed by the Corporation for a term of years.[3] In the Division that first adopted them, they consist of three papers: one with questions on the entire field of History, Government, and Economics, a second on one of these three, and a third on the student's 'special field,' such as Ancient History, International Law and Diplomacy, or Economic Theory. The questions, so far as possible, are of a nature to test intelligence, originality, and reflection, as well as knowledge.

In order to prepare students for the 'divisionals,' a special corps of

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courses: one in Literature, one in History (or Government 1), one in Science, and one in Mathematics or Philosophy; but no one of the four might fall within the student's actual field of concentration. See also the chapters on Philosophy and on Mathematics, in this volume.

[1] *Report* for 1908–09, p. 9.

[2] See pp. 36, 37, and 70, 71, below.

[3] Harvard has not, however, adopted the English system of having an examiner from outside the University, as no University within convenient distance of Cambridge has yet adopted a similar system.

tutors is appointed for each Division as it adopts the system. These tutors are, in part, regular course-giving members of the staff, giving half their time to tutoring: professors such as Taussig and Burbank of the Economics Department. Some divisions have none other; but mostly the tutors are young men appointed for the special purpose, having a taste for personal instruction. Tutorial instruction begins in Sophomore year. Normally the tutors see their pupils for an hour weekly, or fortnightly. They assign reading either to cover gaps left in the pupil's course programme, or to stimulate his interest, or to 'tie together' (a familiar phrase) different branches of the subject. They may ask for essays or bring together groups of pupils for discussion; but all reading with tutors is voluntary, and courses remain a first charge on the student's time.

The war interrupted the application of the tutorial system. It did not really get going in the Division of History, Government, and Economics until 1919, when the Divisions of Modern Languages, Classics, and others adopted it for the Class of 1922 and those following. The latest recruit is the Division of Geology, for the Class of 1931. Chemistry and the Engineering Sciences are the only Divisions still outside the system.[1]

Tutorial instruction and the General Examinations were inaugurated under great difficulties, apart from the war; and have worked much better in some fields, notably in History, than in others, notably Modern Languages. The continued zeal of President Lowell, the support of the Corporation, and the generosity of the alumni surmounted the initial difficulty of increased expense; but few men competent to be tutors could at first be found, and they, unless promptly promoted and allowed to give courses, were apt to become discontented and go elsewhere. Most students at first were indifferent or hostile; and it required some patience to let them see for themselves that the tutors were their friends and helpers whose aid it was unwise to refuse, rather than superfluities or taskmasters. Rhodes scholarships, furnishing us with Oxford-trained tutors, and the growing student demand for personal attention, helped the system to get established. The staff of tutors was a staff of strength in checking the post-war slump in undergraduate morale, and relating study to the somewhat exaggerated ego of the 'plastic age.' If either courses or tutorial instruction had to be dropped in 1929, it is safe to predict that a majority of the upperclassmen, in some fields at least, and the honors men in all, would retain the tutors.[2]

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[1] All the 'combined fields of concentration,' such as Classics and History, also required divisional examinations for the A.B. in 1929, except Astronomy with Physics and Mathematics.

[2] A course called the History of Liberty, designed to help Seniors in History to 'tie together' their ideas from individual courses, was dropped in 1924, since the tutorial system had developed sufficiently to make such courses no longer necessary.

Most encouraging has been the increased number of candidates for honors. They have to offer a thesis, and pass their divisionals with distinction; but find this extra exertion well repaid by the increased interest, although the American public puts no such premium as does the English public on college honors. In some divisions, honors men are now allowed to drop the equivalent of two courses in Senior year. The natural evolution will be toward the abolition of all required course work for honors men after the Sophomore year, as certain American colleges have already done. A step toward this is the 'Reading Period' of two and a half weeks in each term, when all instruction is suspended save in elementary courses, a reform adopted by practically all departments of the College in the year 1927–28.

On the whole, however, Harvard undergraduates are still course-conscious rather than subject-conscious; they talk of 'taking courses' as in pre-tutorial days, rather than studying a subject. And as long as the course requirements remain what they are, consuming by far the greater part of the student's time, and constantly interrupting his steady pursuit of a subject by tests, reports, and hour examinations, this must be so. Courses are still the be-all and the end-all for the average underclassman; only in Junior year do the Divisionals begin to loom. A further difficulty is in the nature of the Divisionals themselves. It requires an art in examining to frame questions that will test critical ability and reflection rather than memory; still more to provide for the needs of all concentrators in one field, without setting questions that can be spotted by taking particular courses. If, then, the tutorial system and the divisionals are no longer a fifth wheel to the coach, they cannot be said to have become as yet a driving wheel to the engine.

3. VOLUNTARY WORSHIP

1886–1929

By Francis G. Peabody, S.T.D.

Plummer Professor of Christian Morals, Emeritus

Harvard College, throughout the two and one-half centuries of its history before 1886, required the presence — though it could not compel the worship — of its undergraduates at daily prayers and Sunday services, as an essential part of the discipline of youth. Other privately endowed colleges of the United States almost without exception followed this example. It was in effect a penal system, with officials watching each morning for indecorum or insufficient attire, and with monitors standing during the conduct of worship, with their backs to the preacher, to check absentees. From time to time a wave of protest had swept up from the students upon the Governing Boards, and in 1885 it had become formidable. A petition was presented by students, urging that compulsory attendance at worship was 'a remnant of ancient encroachments on civil liberty' and therefore tyrannical and unjust. The Board of Overseers thereupon appointed a committee of three to consider this petition, and the committee submitted its opinion that there was no more tyranny involved in compulsion at worship than at recitations and lectures, and that Harvard College 'can ill afford the loss of reputation which would ensue in its being the first of all literary institutions in New England to abandon religious observances.' This report was approved by a majority of the Board of Overseers, including President Eliot and Phillips Brooks. The vote was 20 to 4.

The situation thus created was serious. The committee had assumed that the only alternative to compulsion of attendance at worship was likely to be the discontinuance of worship. Meantime, Dr. Andrew P. Peabody had resigned his place as Plummer Professor and Preacher to the University, and Phillips Brooks, though with great reluctance, had yielded to the pressure of his friends in Boston, and had declined to accept the Plummer professorship. Under these circumstances Ebenezer Rockwood Hoar, a member of the Board of Overseers, advised President Eliot to present my name for the position. I found myself, however, concurring completely with the view of the undergraduates that compulsory attendance at chapel was 'repugnant' and 'unjust.' It seemed to me that the necessary transition might be made, not as a retreat but as an advance; and that liberty might be consistent with efficiency and persuasiveness. The following letter was therefore sent to Phillips Brooks, as a member of the committee considering the petition of students:

CAMBRIDGE, *March 21, 1886*

MY DEAR SIR:

To any one who cares about religion and about Harvard College the vote of the Overseers this week is a matter of great concern, and I will not apologize for offering even the least contribution to the question.

It seems plain that the time has come for a great transition. The dogma of the University is now 'Discipline through Liberty.' Under this method the old customs of worship are near extinction. Sunday worship is driven from morning to evening, and from the whole year to less than half; and Prayers are seen to be a survival. If the Overseers simply vote to abandon the present method of Prayers they are taking the last step in secularization, and a step which cannot be retraced.

But, on the other hand, they may so make the transition that the change shall be, not a surrender, but an advance. Instead of eliminating religious life, they may so magnify its office that the question of method in Prayers shall be subordinated. If there could be in the University a healthy movement of religious interest, one need not fear the fate of the voluntary method. The main duty therefore, as it seems to me, of the Overseers is to make this change a change forward, so that they shall not seem to retreat from religion, but shall develope the present unsatisfactory ways into more living ones.

To this end they should, in my judgment, proceed thus:

1. They should postpone action on the Prayers petition until it can be developed into a larger scheme.

2. They should demand that the administration of religion be magnified into the work of a Department. A Department in Harvard University means a staff of from three to six men, and an expenditure of from $10,000. to $20,000. a year. The work of the University is now done by Departments. Members of this staff act in concert and for the good of the Department. A slight beginning in the direction of a Department has been already made in Religion through the coöperation of eight men in the conduct of Prayers. It is this same method which should now be thoroughly attempted.

3. The organization of this department should be in plan like that of a large English Church. There should be: (*a*) The permanently resident minister, who should be the Administrator of the Department, as a Dean administers a church; (*b*) A staff, not of assistants, but of coadjutors, who should take their turn in service, as Canons succeed each other in a church. These persons should be officially ap-

pointed, as lecturers and professors are appointed, by the Board of Overseers. They should be, during their term, within reach as pastors. They should be of different denominations. They should confer with each other for connected work throughout the year. They should be well paid, as for a position of high honor and responsibility.

4. This Departmental body may accomplish work like the following: Sunday evening worship throughout the year; Voluntary daily Prayers; Weekday afternoon vesper service, with music; Sunday afternoon instruction in religious social duty; The provision of a Board of Advisors for students, through an hour and place where they may be found.

Varied and active work like this cannot be accomplished by one man. Nor is it well that one man should represent religion in the University. In such enlargement of duty the present problem becomes insignificant.

Very truly yours,
Francis G. Peabody

The plan thus outlined appeared to Dr. Brooks to open a way out of the dilemma, and a few days later he announced to the Board of Overseers his warm endorsement of the comprehensive scheme; not 'as a concession merely to the expressed wishes of the students, but as in itself the ideal arrangement, to be adopted because of its inherent fitness and propriety.'[1] The first staff of Preachers was thereupon designated, in May, 1886, consisting of Edward Everett Hale (A.B. 1839), Alexander McKenzie (A.B. 1859), Phillips Brooks (A.B. 1855), George A. Gordon (A.B. 1881), and a young Baptist, Richard Montague (A.B. 1875), who was, unfortunately, prevented by ill health from service. These Preachers, together with the Plummer Professor, made it their first duty to transmit to the President and Fellows of the University the following votes:

'June 8, 1886

'President and Fellows of Harvard University:

'Dear Sirs:

'The Plummer Professor and the Preachers to the University as appointed for the year 1886–87, have conferred concerning the work of that year, and desire to make to the Corporation the following recommendations:

'1. We recommend that in Statute 15, concerning religious service, the clause 'at which the attendance of the students is required' be stricken out.

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[1] The discussion is reported in detail in A. V. G. Allen's *Life and Letters of Phillips Brooks*, ii (1900), 613–618.

'2. It is out intention to hold daily prayers and Sunday evening worship throughout the academic year, and also an afternoon vesper service once a week during a part of the year. We therefore recommend that an increased appropriation be made for music in the College Chapel.'

'June 29, 1886.

'President and Fellows of Harvard University:

'Dear Sirs:

'At a meeting of the Plummer Professor and the Preachers to the University as appointed for the year 1886–87, held June 28, 1886, it was

'*Voted*, That the Corporation and Overseers be recommended to make such alteration in Statute XIII (concerning the Parietal committee) as shall free the Parietal Committee from the obligation of attending daily Prayers.'

In acknowledging the receipt of these recommendations, President Eliot, with characteristic loyalty, replied, 'Whatever measures the Board may propose I intend to support.'

The new plan, thus designed, was launched in September, 1886, at a religious service in which all the Preachers took part. There was no lack of scepticism, both in the College staff and in the community, concerning so bold a venture of faith. A much respected professor expressed the opinion that religious interest could not be expected from college students. They had, he thought, outgrown the religion of the home and had not arrived at the religion of maturity. On the other hand, the Preachers applied themselves to their task with confidence, meeting frequently for conference, kneeling in prayer for guidance, and scrutinizing each detail of administration. Each Preacher accepted duty for four Sunday evenings during the college year, and for the intervening five weeks of daily Prayers, detaching himself for this considerable term from his official duties or professional cares. Daily worship was enriched by the addition of a full choir of men and boys, instead of the meagre music of an unpaid and uninstructed choir of students.[1] A new hymn book and a book of readings were compiled, adapted to the needs of young men. Special services were arranged for Thursday afternoons and attracted large number of listeners; and a collection of the brief addresses there delivered was published under the title, Harvard Vespers. A Preachers' Room was established in the venerable house of the early Presidents of the University, and there, each morning during his term of service, the Preacher was at home to students, often for paternal or fraternal conversation, but not infrequently for interviews so intimate and searching as to make the Preachers' Room a confessional. A book of confidential records, in which each Preacher transmitted to his successors the lessons of hope or warning which he had derived from his experience, has become in the course of many years a precious and convincing testimony of this generous and happy service.

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[1] See Professor Spalding's chapter on Music, in this volume.

With these provisions for dignity and for rational appeal, but without excessive anticipation of numerical results, the Preachers organized the administration of their untried work. In one of their first conferences the question was raised as to what might be considered a sufficient attendance to justify the plan. One Preacher suggested an average of one hundred; to which Phillips Brooks, with confident optimism, replied: 'If fifty young men come to that chapel in the early morning for no other purpose than to say their prayers, it will be the largest daily Protestant congregation in the world.' Dr. Brooks was no doubt aware that a slight fallacy lay behind this gallant affirmation; for the number of Protestant congregations which gather thus at 8.45 A.M. for daily worship is inconsiderable. Yet the brave prophecy of his colleague was amply fulfilled, and for a term of forty years the habitual attendance has justified the faith of the Bishop in the responsiveness and loyalty of educated youth. After his first term of service Dr. Brooks wrote to the Plummer Professor: 'I cannot tell you how much I have enjoyed this last busy month, or how deeply interested I am in the world over which you preside. Pray use me for it in any way, at any time, and do not let even Cambridge quench your hope.'

Another problem which immediately confronted the Preachers was that of obtaining their successors. Would it be possible to draw from the work of their winter the most convincing preachers of the country? Would the needs of college youth take precedence of the normal demands made on these very busy men? The first Staff had accepted the challenge of an unprecedented experiment. Would the call of the University remain imperative when the plan had grown more familiar? This apprehension happily proved unjustified. The University has not hestitated to call to its service the most distinguished and effective preachers of many communions, often from a considerable distance, and has proposed to them two terms of duty, covering several weeks. Yet in all these years this call had been declined but once, and that in the first year of the new order, when its significance had not been thoroughly proved. One of the most preoccupied of the list, Lyman Abbott, was summoned to the University when he was both pastor of the Plymouth Church in Brooklyn and editor of The Outlook. After some consideration, however, he replied that the call to Harvard was one which he found almost impossible to accept but entirely impossible to refuse. Thus, for terms of service varying from one year to five, and in some cases extended by a second appointment even to seven years, the University has commanded for forty years the devotion of eminent and effective preachers, and the duty has been accepted by them, not as a superadded burden, but as a privilege and distinction.

The further history of voluntary prayers and of the Staff of Preachers is not that of an experiment, but of an institution. No radical change has occurred in method of administration, and no practical alternative has been suggested. There remain, no doubt, some members of the University, both young and old, who take no interest in religion, and some who care for religion only if it be administered under the forms or regulations of a single communion; but there is slight dissent from the general conclusion that the traditions of Harvard College call for the maintenance of Christian worship, and that such worship must be undenominational and unconstrained. With the appointment, in 1905, of Edward Caldwell Moore to be Plummer Professor and Chairman of the Board of Preachers, some technical modifications occurred which have contributed to effectiveness. Worship on Sunday has been transferred from evening to morning, with a consequent increase of attendance of the families of professors, for whom the University Chapel has become in some degree a parish church. The choir of men and boys has been succeeded by a selected group of students, admirably trained by the remarkable leader and organist, Professor A. T. Davison. Various special occasions have been arranged by the Chairman of the Board, whose self-effacing administration has contributed much to the stability and permanence of the work.

For these purposes, and for the spaciousness, dignity, and beauty appropriate to the work, a worthier chapel has become an immediate need. It is a chastening fact that the most reasonable scheme of daily worship ever undertaken by an American university is still restricted by an inadequate and uninviting place of worship. Few colleges, however modest in their scope,—indeed, few schools of a modern type,—are so ill-equipped; and the building of an adequate chapel, as now proposed, with its secluded space for morning prayers, its great nave for Sunday worship, and its memorial of the youths who died for their country, will greatly reënforce the spirit of reverence and loyalty.

It is reassuring to notice among the signs of the present time a manifest inclination on the part of other colleges and universities to follow, even if tardily, the way which Harvard University has gone, and to apply, with various modifications, the principle of voluntary worship. The restlessness which was conspicuous among Harvard undergraduates forty years ago is now exhibited in many other colleges; and the Harvard plan of enriching and dignifying worship so that it can bear the strain of liberty has been generally followed, or is under consideration. Harvard University has often been reproached for indifference or infidelity concerning religion. It would be an interesting result of the prolonged and devoted effort to give Christian worship a worthy place in the life of Harvard University if it should encourage other places of learning in welcoming a similar transition from religion as a discipline to religion as a privilege.[1]

This record of religious activity at Harvard University under a voluntary system would not be complete without indicating the evidences of participation and initiative on the part of students; and these, in their external and organized form, are represented in the operations of the special building known as Phillips Brooks House.

In 1890, four years after the voluntary system was established, the Preachers to the University sent to selected friends a personal and unpublished letter, urging the 'need of a new building of moderate size within the College Yard for the use of the University Preachers and the religious societies.' By a tragic coincidence, this letter, signed by Phillips Brooks among the other preachers, had hardly reached its readers when Phillips Brooks suddenly died, and it became at once evident that the building thus proposed should be a memorial of his beloved life. A special committee was thereupon formed, and subscriptions were received from more than five hundred contributors, old and young, near and far away, in this and other countries, testifying to the widespread sense of loss and to the fitness of such a memorial in the college which Phillips Brooks had so devotedly served.

The house was opened in January, 1900, on the seventh anniversary of the death of Phillips Brooks. In its hallway was set a bust of Phillips Brooks and a tablet announcing as follows the purpose of the building:

THIS HOUSE
IS DEDICATED TO
PIETY, CHARITY, HOSPITALITY
IN GRATEFUL MEMORY OF
PHILLIPS BROOKS

The three objects thus indicated were at once promoted by the establishment of this commodious and beautiful meeting-place. The religious societies of students, hitherto holding their sessions in lecture rooms or private studies, were supplied with quarters adapted to their varied forms of work and worship; the undertakings of social service by students were fortified by a trained adviser, who assigned young men to appropriate tasks of charity; and the large living-room, furnished in part with Phillips Brooks's own tables and rugs, offered its hospitality to many organizations, both of student life and of the neighboring community.

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[1] Amherst College, in 1926, adopted a plan requiring compulsory chapel attendance three or four days out of every seven; Bowdoin has compulsory attendance, with twenty to thirty-five 'cuts' allowed each semester; Brown requires chapel attendance every other week-day; at Chicago, compulsory attendance was abolished in 1927; Dartmouth adopted the voluntary system in 1924–25; Cornell has never had compulsory chapel; Williams adopted in 1927 a system similar to that of Bowdoin; Yale adopted voluntary chapel in 1926, placing the daily service at 10.30, when there are no meetings of courses. All the colleges of the University of Oxford, except Keble, have adopted the voluntary system since the war.

During the twenty-nine years of the existence of the Phillips Brooks House, it has well fulfilled its three functions: Piety, Charity, Hospitality. It has provided a meeting-place for several communions represented among the student body, but without a convenient place of worship near by: such as the Friends, Lutherans, and Hebrews.[1] The Chapel Committee coöperates with the Chairman of the Board of Preachers in several ways. Sunday schools are maintained, missions supported, and mission conferences attended by student delegates. On the side of charity, the Brooks House collects clothing and books, provides students with opportunities to become boy scout leaders, speakers, and social workers. The note of hospitality is constantly emphasized, from the opening of College when new students are welcomed and provided with a handbook, to Class Day, when a spread is maintained. Recent economic and social tendencies have lessened both the interest in and the apparent need for social service outside the University, and at the same time have greatly increased the need for it within the University, among the students themselves.

Down to 1929 the House was managed by a rather complicated system in which faculty, alumni, and students had a part, the 'P. B. H. Cabinet,' or controlling committee, being elected by all members of the University belonging to the Phillips Brooks House Association. In January, 1929, the government of the House was reorganized on the principle that only active workers in the organization should have a voice in directing the House. In a word, the Phillips Brooks House has become what one of its founders anticipated it would be, a 'hearthstone of the University,' and has confirmed the Preachers to the University in their confident faith that religion offered as a privilege and opportunity would not fail of response from the eager and generous minds of academic youth.

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[1] The St. Paul's Society (Episcopalian), after a continuous existence since 1862, was disbanded in 1929 owing to the lack of interest. The St. Paul's Catholic Club, after using the Brooks House as headquarters for many years, obtained a centre of its own, and in 1929 withdrew from the Phillips Brooks House Association.

PHILLIPS BROOKS

1885

CHARLES W. ELIOT

1870

4. PRESIDENT ELIOT'S INAUGURAL ADDRESS

OCTOBER 19, 1869

THE endless controversies whether language, philosophy, mathematics, or science supplies the best mental training, whether general education should be chiefly literary or chiefly scientific, have no practical lesson for us to-day. This University recognizes no real antagonism between literature and science, and consents to no such narrow alternatives as mathematics or classics, science or metaphysics. We would have them all, and at their best. To observe keenly, to reason soundly, and to imagine vividly are operations as essential as that of clear and forcible expression; and to develop one of these faculties, it is not necessary to repress and dwarf the others. A university is not closely concerned with the applications of knowledge until its general education branches into professional. Poetry and philosophy and science do indeed conspire to promote the material welfare of mankind; but science no more than poetry finds its best warrant in its utility. Truth and right are above utility in all realms of thought and action.

It were a bitter mockery to suggest that any subject whatever should be taught less than it now is in American colleges. The only conceivable aim of a college government in our day is to broaden, deepen, and invigorate American teaching in all branches of learning. It will be generations before the best of American institutions of education will get growth enough to bear pruning. The descendants of the Pilgrim Fathers are still very thankful for the parched corn of learning.

Recent discussions have added pitifully little to the world's stock of wisdom about the staple of education. Who blows to-day such a ringing trumpet-call to the study of language as Luther blew? Hardly a significant word has been added in two centuries to Milton's description of the unprofitable way to study languages. Would any young American learn how to profit by travel, that foolish beginning but excellent sequel to education, he can find no apter advice than Bacon's. The practice of England and America is literally centuries behind the precept of the best thinkers upon education. A striking illustration may be found in the prevailing neglect of the systematic study of the English language. How lamentably true to-day are these words of Locke: "If any one among us have a facility or purity more than ordinary in his mother-tongue, it is owing to chance, or his genius, or anything rather than to his education or any care of his teacher."

The best result of the discussion which has raged so long about the relative educational value of the main branches of learning is the conviction that there is room for them all in a sound scheme, provided that right methods of teaching be employed. It is not because of the limitation of their faculties that boys of eighteen come to college, having mastered nothing but a few score pages of Latin and Greek, and the bare elements of mathematics. Not nature, but an unintelligent system of instruction from the primary school through the college, is responsible for the fact that many college graduates have so inadequate a conception of what is meant by scientific observation, reasoning, and proof. It is possible for the young to get actual experience of all the principal methods of thought. There is a method of thought in language, and a method in mathematics, and another of natural and physical science, and another of faith. With wise direction, even a child would drink at all these springs. The actual problem to be solved is not what to teach, but how to teach. The revolutions accomplished in other fields of labor have a lesson for teachers. New England could not cut her hay with scythes, or the West her wheat with sickles. When millions are to be fed where formerly there were but scores, the single fish-line must be replaced by seines and trawls, the human shoulders by steam-elevators, and the wooden-axled ox-cart on a corduroy road by the smooth-running freight-train. In education, there is a great hungry multitude to be fed. The great well at Orvieto, up whose spiral paths files of donkeys painfully brought the sweet water in kegs, was an admirable construction in its day; but now we tap Fresh Pond in our chambers. The Orvieto well might remind some persons of educational methods not yet extinct. With good methods, we may confidently hope to give young men of twenty to twenty-five an accurate general knowledge of all the main subjects of human interest, besides a minute and thorough knowledge of the one subject which each may select as his principal occupation in life. To think this impossible is to despair of mankind; for unless a general acquaintance with many branches of knowledge, good so far as it goes, be attainable by great numbers of men, there can be no such thing as an intelligent public opinion; and in the modern world the intelligence of public opinion is the one indispensable condition of social progress.

What has been said of needed reformation in methods of teaching the subjects which have already been nominally admitted to the American curriculum applies not only to the university, but to the preparatory schools of every grade down to the primary. The American college is obliged to supplement the American school. Whatever elementary instruction the schools fail to give, the college must supply. The improvement of the schools has of late years permitted the college to advance the grade of its teaching, and adapt the methods of its later years to men instead of boys. This improvement of the college reacts upon the schools to their advantage; and this action and reaction will be continuous. A university is not built in the air, but on social and literary foundations which preceding generations have bequeathed. If the whole structure needs rebuilding, it must be rebuilt from the foundation. Hence, sudden reconstruction is impossible in our high places of education. Such inducements as the College can offer for enriching and enlarging the course of study pursued in preparatory schools, the Faculty has recently decided to give. The requirements in Latin and Greek grammar are to be set at a thorough knowledge of forms and general principles; the lists of classical authors accepted as equivalents for the regular standards are to be enlarged; an acquaintance with physical geography is to be required; the study of elementary mechanics is to be recommended, and prizes are to be offered for reading aloud, and for the critical analysis of passages from English authors. At the same time the University will take to heart the counsel which it gives to others.

In every department of learning the University would search out by trial and reflection the best methods of instruction. The University believes in the thorough study of language. It contends for all languages — Oriental, Greek, Latin, Romance, German, and especially for the mother-tongue; seeing in them all one institution, one history, one means of discipline, one department of learning. In teaching languages, it is for this American generation to invent, or to accept from abroad, better tools than the old; to devise, or to transplant from Europe, prompter and more comprehensive methods than the prevailing; and to command more intelligent labor, in order to gather rapidly and surely the best fruit of that culture and have time for other harvests.

The University recognizes the natural and physical sciences as indispensable branches of education, and has long acted upon this opinion; but it would have science taught in a rational way, objects and instruments in hand — not from books merely, not through the memory chiefly, but by the seeing eye and the informing fingers. Some of the scientific scoffers at gerund grinding and nonsense verses might well look at home; the prevailing methods of teaching science, the world over, are, on the whole, less intelligent than the methods of teaching language. The University would have scientific studies in school and college and professional school develop and discipline those powers of the mind by which science has been created and is daily nourished — the powers of observation, the inductive faculty, the sober imagination, the sincere and proportionate judgment. A student in the elements gets no such training by studying even a good text-book, though he really master it, nor yet by sitting at the feet of the most admirable lecturer.

If there be any subject which seems fixed and settled in its educational aspects, it is the mathematics; yet there is no department of the University which has been, during the last fifteen years, in such a state of vigorous experiment upon methods and appliances of teaching as the mathematical department. It would be well if the primary schools had as much faith in the possibility of improving their way of teaching multiplication.

The important place which history, and mental, moral, and political philosophy, should hold in any broad scheme of education is recognized of all; but none know so well how crude are the prevailing methods of teaching these subjects as those who teach them best. They cannot be taught from books alone, but must be vivified and illustrated by teachers of active, comprehensive, and judicial mind. To learn by rote a list of dates is not to study history. Mr. Emerson says that history is biography. In a deep sense this is true. Certainly, the best way to impart the facts of history to the young is through the quick interest they take in the lives of the men and women who fill great historical scenes or epitomize epochs. From the centres so established, their interest may be spread over great areas. For the young especially, it is better to enter with intense sympathy into the great moments of history, than to stretch a thin attention through its weary centuries.

Philosophical subjects should never be taught with authority. They are not established sciences; they are full of disputed matters, open questions, and bottomless speculations. It is not the function of the teacher to settle philosophical and political controversies for the pupil, or even to recommend to him any one set of opinions as better than another. Exposition, not imposition, of opinions is the professor's part. The student should be made acquainted with all sides of these controversies, with the salient points of each system; he should be shown what is still in force of institutions or philosophies mainly outgrown, and what is new in those now in vogue. The very word "education" is a standing protest against dogmatic teaching. The notion that education consists in the authoritative inculcation of what the teacher deems true may be logical and appropriate in a convent, or a seminary for priests, but it is intolerable in universities and public schools, from primary to professional. The worthy fruit of academic culture is an open mind, trained to careful thinking, instructed in the methods of philosophic investigation, acquainted in a general way with the accumulated thought of past generations, and penetrated with humility. It is thus that the university in our day serves Christ and the church.

The increasing weight, range, and thoroughness of the examination for admission to college may strike some observers with dismay. The increase of real requisitions is hardly perceptible from year to year; but on looking back ten or twenty years, the changes are marked, and all in one direction. The dignity and importance of this examination have been steadily rising, and this rise measures the improvement of the preparatory schools. When the gradual improvement of American schools has lifted them to a level with the German gymnasia, we may expect to see the American college bearing a nearer resemblance to the German faculties of philosophy than it now does. The actual admission examination may best be compared with the first examination of the University of France. This examination, which comes at the end of a French boy's school life, is for the degree of Bachelor of Arts or of Sciences. The degree is given to young men who come fresh from school and have never been under university teachers; a large part of the recipients never enter the university. The young men who come to our examination for admission to college are older than the average of French Bachelors of Arts. The examination tests not only the capacity of the candidates, but also the quality of their school instruction; it is a great event in their lives, though not, as in France, marked by any degree. The examination is conducted by college professors and tutors who have never had any relations whatever with those examined. It would be a great gain if all subsequent college examinations could be as impartially conducted by competent examiners brought from without the college and paid for their services. When the teacher examines his class, there is no effective examination of the teacher. If the examinations for the scientific, theological, medical, and dental degrees were conducted by independent boards of examiners, appointed by professional bodies of dignity and influence, the significance of these degrees would be greatly enhanced. The same might be said of the degree of Bachelor of Laws, were it not that this degree is, at present, earned by attendance alone, and not by attendance and examination. The American practice of allowing the teaching body to examine for degrees has been partly dictated by the scarcity of men outside the faculties who are at once thoroughly acquainted with the subjects of examination, and sufficiently versed in teaching to know what may fairly be expected of both students and instructors. This difficulty could now be overcome. The chief reason, however, for the existence of this practice is that the faculties were the only bodies that could confer degrees intelligently, when degrees were obtained by passing through a prescribed course of study without serious checks, and completing a certain term of residence without disgrace. The change in the manner of earning the University degrees ought, by right, to have brought into being an examining body distinct from the teaching body. So far as the College proper is concerned, the Board of Overseers have, during the past year, taken a step which tends in this direction.

The rigorous examination for admission has one good effect throughout the college course: it prevents a waste of instruction upon incompetent persons. A school with a low standard for admission and a high standard of graduation, like West Point, is obliged to dismiss a large proportion of its students by the way. Hence much individual distress, and a great waste of resources, both public and private. But, on the other hand, it must not be supposed that every student who enters Harvard College necessarily graduates. Strict annual examinations are to be passed. More than a fourth of those who enter the College fail to take their degree.

Only a few years ago, all students who graduated at this College passed through one uniform curriculum. Every man studied the same subjects in the same proportions, without regard to his natural bent or preference. The individual student had no choice of either subjects or teachers. This system is still the prevailing system among American colleges, and finds vigorous defenders. It has the merit of simplicity. So had the school methods of our grandfathers — one primer, one catechism, one rod for all children. On the whole, a single common course of studies, tolerably well selected to meet the average needs, seems to most Americans a very proper and natural thing, even for grown men.

As a people, we do not apply to mental activities the principle of division of labor; and we have but a halting faith in special training for high professional employments. The vulgar conceit that a Yankee can turn his hand to anything we insensibly carry into high places, where it is preposterous and criminal. We are accustomed to seeing men leap from farm or shop to court-room or pulpit, and we half believe that common men can safely use the seven-league boots of genius. What amount of knowledge and experience do we habitually demand of our lawgivers? What special training do we ordinarily think necessary for our diplomatists? — although in great emergencies the nation has known where to turn. Only after years of the bitterest experience did we come to believe the professional training of a soldier to be of value in war. This lack of faith in the prophecy of a natural bent, and in the value of a discipline concentrated upon a single object, amounts to a national danger.

In education, the individual traits of different minds have not been sufficiently attended to. Through all the period of boyhood the school studies should be representative; all the main fields of knowledge should be entered upon. But the young man of nineteen or twenty ought to know what he likes best and is most fit for. If his previous training has been sufficiently wide, he will know by that time whether he is most apt at language or philosophy or natural science or mathematics. If he feels no loves, he will at least have his hates. At that age the teacher may wisely abandon the schooldame's practice of giving a copy of nothing but zeros to the child who alleges that he cannot make that figure. When the revelation of his own peculiar taste and capacity comes to a young man, let him reverently give it welcome, thank God, and take courage. Thereafter he knows his way to happy, enthusiastic work, and, God willing, to usefulness and success. The civilization of a people may be inferred from the variety of its tools. There are thousands of years between the stone hatchet and the machine-shop. As tools multiply, each is more ingeniously adapted to its own exclusive purpose. So with the men that make the State. For the individual, concentration, and the highest development of his own peculiar faculty, is the only prudence. But for the State, it is variety, not uniformity, of intellectual product, which is needful.

These principles are the justification of the system of elective studies which has been gradually developed in this College during the past forty years. At present the Freshman year is the only one in which there is a fixed course prescribed for all. In the other three years, more than half the time allotted to study is filled with subjects chosen by each student from lists which comprise six studies in the Sophomore year, nine in the Junior year, and eleven in the Senior year. The range of elective studies is large, though there are some striking deficiencies. The liberty of choice of subject is wide, but yet has very rigid limits. There is a certain framework which must be filled; and about half the material of the filling is prescribed. The choice offered to the student does not lie between liberal studies and professional or utilitarian studies. All the studies which are open to him are liberal and disciplinary, not narrow or special. Under this system the College does not demand, it is true, one invariable set of studies of every candidate for the first degree in Arts; but its requisitions for this degree are nevertheless high and inflexible, being nothing less than four years devoted to liberal culture.

It has been alleged that the elective system must weaken the bond which unites members of the same class. This is true; but in view of another much more efficient cause of the diminution of class intimacy, the point is not very significant. The increased size of the college classes inevitably works a great change in this respect. One hundred and fifty young men cannot be so intimate with each other as fifty used to be. This increase is progressive. Taken in connection with the rising average age of the students, it would compel the adoption of methods of instruction different from the old, if there were no better motive for such change. The elective system fosters scholarship, because it gives free play to natural preferences and inborn aptitudes, makes possible enthusiasm for a chosen work, relieves the professor and the ardent disciple of the presence of a body of students who are compelled to an unwelcome task, and enlarges instruction by substituting many and various lessons given to small, lively classes, for a few lessons many times repeated to different sections of a numerous class. The College therefore proposes to persevere in its efforts to establish, improve, and extend the elective system. Its administrative difficulties, which seem formidable at first, vanish before a brief experience.

There has been much discussion about the comparative merits of lectures and recitations. Both are useful — lectures, for inspiration, guidance, and the comprehensive methodizing which only one who has a view of the whole field can rightly contrive; recitations, for securing and testifying a thorough mastery on the part of the pupil of the treatise or author in hand, for conversational comment and amplification, for emulation and competition. Recitations alone readily degenerate into dusty repetitions, and lectures alone are too often a useless expenditure of force. The lecturer pumps laboriously into sieves. The water may be wholesome, but it runs through. A mind must work to grow. Just as far, however, as the student can be relied on to master and appreciate his author without the aid of frequent questioning and repetitions, so far is it possible to dispense with recitations. Accordingly, in the later College years there is a decided tendency to diminish the number of recitations, the faithfulness of the student being tested by periodical examinations. This tendency is in a right direction, if prudently controlled.

The discussion about lectures and recitations has brought out some strong opinions about textbooks and their use. Impatience with textbooks and manuals is very natural in both teachers and taught. These books are indeed, for the most part, very imperfect, and stand in constant need of correction by the well-informed teacher. Stereotyping, in its present undeveloped condition, is in part to blame for their most exasperating defects. To make the metal plates keep pace with the progress of learning is costly. The manifest deficiencies of textbooks must not, however, drive us into a too sweeping condemnation of their use. It is a rare teacher who is superior to all manuals in his subject. Scientific manuals are, as a rule, much worse than those upon language, literature, or philosophy; yet the main improvement in medical education in this country during the last twenty years has been the addition of systematic recitations from textbooks to the lectures which were formerly the principal means of theoretical instruction. The training of a medical student, inadequate as it is, offers the best example we have of the methods and fruits of an education mainly scientific. The transformation which the average student of a good medical school undergoes in three years is strong testimony to the efficiency of the training he receives.

There are certain common misapprehensions about colleges in general, and this College in particular, to which I wish to devote a few moments' attention. And, first, in spite of the familiar picture of the moral dangers which environ the student, there is no place so safe as a good college during the critical passage from boyhood to manhood. The security of the college commonwealth is largely due to its exuberant activity. Its public opinion, though easily led astray, is still high in the main. Its scholarly tastes and habits, its eager friendships and quick hatreds, its keen debates, its frank discussions of character and of deep political and religious questions, all are safeguards against sloth, vulgarity, and depravity. Its society and, not less, its solitudes are full of teaching. Shams, conceit, and fictitious distinctions get no mercy. There is nothing but ridicule for bombast and sentimentality. Repression of genuine sentiment and emotion is indeed, in this College, carried too far. Reserve is more respectable than any undiscerning communicativeness; but neither Yankee shamefacedness nor English stolidity is admirable. This point especially touches you, young men, who are still undergraduates. When you feel a true admiration for a teacher, a glow of enthusiasm for work, a thrill of pleasure at some excellent saying, give it expression. Do not be ashamed of these emotions. Cherish the natural sentiment of personal devotion to the teacher who calls out your better powers. It is a great delight to serve an intellectual master. We Americans are but too apt to lose this happiness. German and French students get it. If ever in after years you come to smile at the youthful reverence you paid, believe me, it will be with tears in your eyes.

Many excellent persons see great offence in any system of college rank; but why should we expect more of young men than we do of their elders? How many men and women perform their daily tasks from the highest motives alone — for the glory of God and the relief of man's estate? Most people work for bare bread, a few for cake. The college rank-list reinforces higher motives. In the campaign for character, no auxiliaries are to be refused. Next to despising the enemy, it is dangerous to reject allies. To devise a suitable method of estimating the fidelity and attainments of college students is, however, a problem which has long been under discussion, and has not yet received a satisfactory solution. The worst of rank as a stimulus is the self-reference it implies in the aspirants. The less a young man thinks about the cultivation of his mind, about his own mental progress, — about himself, in short, — the better.

The petty discipline of colleges attracts altogether too much attention from both friends and foes. It is to be remembered that the rules concerning decorum, however necessary to maintain the high standard of manners and conduct which characterizes this College, are nevertheless justly described as petty. What is technically called a quiet term cannot be accepted as the acme of university success. This success is not to be measured by the frequency or rarity of college punishments. The criteria of success or failure in a high place of learning are not the boyish escapades of an insignificant minority, nor the exceptional cases of ruinous vice. Each year must be judged by the added opportunities of instruction, by the prevailing enthusiasm in learning, and by the gathered wealth of culture and character. The best way to put boyishness to shame is to foster scholarship and manliness. The manners of a community cannot be improved by main force any more than its morals. The Statutes of the University need some amendment and reduction in the chapters on crimes and misdemeanors. But let us render to our fathers the justice we shall need from our sons. What is too minute or precise for our use was doubtless wise and proper in its day. It was to inculcate a reverent bearing and due consideration for things sacred that the regulations prescribed a black dress on Sunday. Black is not the only decorous wear in these days; but we must not seem, in ceasing from this particular mode of good manners, to think less of the gentle breeding of which only the outward signs, and not the substance, have been changed.

Harvard College has always attracted and still attracts students in all conditions of life. From the city trader or professional man, who may be careless how much his son spends at Cambridge, to the farmer or mechanic, who finds it a hard sacrifice to give his boy his time early enough to enable him to prepare for college, all sorts and conditions of men have wished and still wish to send their sons hither. There are always scores of young men in this University who earn or borrow every dollar they spend here. Every year many young men enter this College without any resources whatever. If they prove themselves men of capacity and character, they never go away for lack of money. More than twenty thousand dollars a year is now devoted to aiding students of narrow means to compass their education, besides all the remitted fees and the numerous private benefactions. These latter are unfailing. Taken in connection with the proceeds of the funds applicable to the aid of poor students, they enable the Corporation to say that no good student need ever stay away from Cambridge or leave college simply because he is poor. There is one uniform condition, however, on which help is given: the recipient must be of promising ability and the best character. The community does not owe superior education to all children, but only to the élite — to those who, having the capacity, prove by hard work that they have also the necessary perserverance and endurance. The process of preparing to enter college under the difficulties which poverty entails is just such a test of worthiness as is needed. At this moment there is no college in the country more eligible for a poor student than Harvard on the mere ground of economy. The scholarship funds are mainly the fruit of the last fifteen years. The future will take care of itself; for it is to be expected that the men who in this generation have had the benefit of these funds, and who succeed in after life, will pay manyfold to their successors in need the debt which they owe, not to the College, but to benefactors whom they cannot even thank, save in heaven. No wonder that scholarships are founded. What greater privilege than this of giving young men of promise the coveted means of intellectual growth and freedom? The angels of heaven might envy mortals so fine a luxury. The happiness which the winning of a scholarship gives is not the recipient's alone; it flashes back to the home whence he came, and gladdens anxious hearts there. The good which it does is not his alone, but descends, multiplying at every step, through generations. Thanks to the beneficent mysteries of hereditary transmission, no capital earns such interest as personal culture. The poorest and the richest students are equally welcome here, provided that with their poverty or their wealth they bring capacity, ambition, and purity. The poverty of scholars is of inestimable worth in this money-getting nation. It maintains the true standards of virtue and honor. The poor friars, not the bishops, saved the church. The poor scholars and preachers of duty defend the modern community against its own material prosperity. Luxury and learning are ill bedfellows. Nevertheless, this College owes much of its distinctive character to those who, bringing hither from refined homes good breeding, gentle tastes, and a manly delicacy, add to them openness and activity of mind, intellectual interests, and a sense of public duty. It is as high a privilege for a rich man's son as for a poor man's to resort to these academic halls, and so to take his proper place among cultivated and intellectual men. To lose altogether the presence of those who in early life have enjoyed the domestic and social advantages of wealth would be as great a blow to the College as to lose the sons of the poor. The interests of the College and the country are identical in this regard. The country suffers when the rich are ignorant and unrefined. Inherited wealth is an unmitigated curse when divorced from culture. Harvard College is sometimes reproached with being aristocratic. If by aristocracy be meant a stupid and pretentious caste, founded on wealth, and birth, and an affectation of European manners, no charge could be more preposterous: the College is intensely American in affectation, and intensely democratic in temper. But there is an aristocracy to which the sons of Harvard have belonged, and, let us hope, will ever aspire to belong — the aristocracy which excels in manly sports, carries off the honors and prizes of the learned professions, and bears itself with distinction in all fields of intellectual labor and combat; the aristocracy which in peace stands firmest for the public honor and renown, and in war rides first into the murderous thickets.

The attitude of the University in the prevailing discussions touching the education and fit employments of women demands brief explanation. America is the natural arena for these debates; for here the female sex has a better past and a better present than elsewhere. Americans, as a rule, hate disabilities of all sorts, whether religious, political, or social. Equality between the sexes, without privilege or oppression on either side, is the happy custom of American homes. While this great discussion is going on, it is the duty of the University to maintain a cautious and expectant policy. The Corporation will not receive women as students into the College proper, nor into any school whose discipline requires residence near the school. The difficulties involved in a common residence of hundreds of young men and women of immature character and marriageable age are very grave. The necessary police regulations are exceedingly burdensome. The Corporation are not influenced to this decision, however, by any crude notions about the innate capacities of women. The world knows next to nothing about the natural mental capacities of the female sex. Only after generations of civil freedom and social equality will it be possible to obtain the data necessary for an adequate discussion of woman's natural tendencies, tastes, and capabilities. Again, the Corporation do not find it necessary to entertain a confident opinion upon the fitness or unfitness of women for professional pursuits. It is not the business of the University to decide this mooted point. In this country the University does not undertake to protect the community against incompetent lawyers, ministers, or doctors. The community must protect itself by refusing to employ such. Practical, not theoretical, considerations determine the policy of the University. Upon a matter concerning which prejudices are deep, and opinion inflammable, and experience scanty, only one course is prudent or justifiable when such great interests are at stake — that of cautious and well-considered experiment. The practical problem is to devise a safe, promising, and instructive experiment. Such an experiment the Corporation have meant to try in opening the newly established University Courses of Instruction to competent women. In these courses the University offers to young women who have been to good schools as many years as they wish of liberal culture in studies which have no direct professional value, to be sure, but which enrich and enlarge both intellect and character. The University hopes thus to contribute to the intellectual emancipation of women. It hopes to prepare some women better than they would otherwise have been prepared for the profession of teaching, the one learned profession to which women have already acquired a clear title. It hopes that the proffer of this higher instruction will have some reflex influence upon schools for girls — to discourage superficiality, and to promote substantial education.

The governing bodies of the University are the Faculties, the Board of Overseers, and the Corporation. The University as a place of study and instruction is, at any moment, what the Faculties make it. The professors, lecturers, and tutors of the University are the living sources of learning and enthusiasm. They personally represent the possibilities of instruction. They are united in several distinct bodies, the academic and professional Faculties, each of which practically determines its own processes and rules. The discussion of methods of instruction is the principal business of these bodies. As a fact, progress comes mainly from the Faculties. This has been conspicuously the case with the Academic and Medical Faculties during the last fifteen or twenty years. The undergraduates used to have a notion that the time of the Academic Faculty was mainly devoted to petty discipline. Nothing could be further from the truth. The Academic Faculty is the most active, vigilant, and devoted body connected with the University. It indeed is constantly obliged to discuss minute details, which might appear trivial to an inexperienced observer. But, in education, technical details tell. Whether German be studied by the Juniors once a week as an extra study, or twice a week as an elective, seems, perhaps, an unimportant matter; but, twenty years hence, it makes all the difference between a generation of Alumni who know German and a generation who do not. The Faculty renews its youth, through the frequent appointments of tutors and assistant professors, better and oftener than any other organization within the University. Two kinds of men make good teachers — young men and men who never grow old. The incessant discussions of the Academic Faculty have borne much fruit: witness the transformation of the University since the beginning of President Walker's administration. And it never tires. New men take up the old debates, and one year's progress is not less than another's. The divisions within the Faculty are never between the old and the young officers. There are always old radicals and young conservatives.

The Medical Faculty affords another illustration of the same principle — that for real university progress we must look principally to the teaching bodies. The Medical School to-day is almost three times as strong as it was fifteen years ago. Its teaching power is greatly increased, and its methods have been much improved. This gain is the work of the Faculty of the School.

If then the Faculties be so important, it is a vital question how the quality of these bodies can be maintained and improved. It is very hard to find competent professors for the University. Very few Americans of eminent ability are attracted to this profession. The pay has been too low, and there has been no gradual rise out of drudgery, such as may reasonably be expected in other learned callings. The law of supply and demand, or the commercial principle that the quality as well as the price of good is best regulated by the natural contest between producers and consumers, never has worked well in the province of high education. And in spite of the high standing of some of its advocates, it is well-nigh certain that the so-called law never can work well in such a field. The reason is that the demand for instructors of the highest class on the part of parents and trustees is an ignorant demand, and the supply of highly educated teachers is so limited that the consumer has not sufficient opportunities of informing himself concerning the real qualities of the article he seeks. Originally a bad judge, he remains a bad judge, because the supply is not sufficiently abundant and various to instruct him. Moreover, a need is not necessarily a demand. Everybody knows that the supposed law affords a very imperfect protection against short weight, adulteration, and sham, even in the case of those commodities which are most abundant in the market and most familiar to buyers. The most intelligent community is defenceless enough in buying clothes and groceries. When it comes to hiring learning and inspiration and personal weight, the law of supply and demand breaks down altogether. A university cannot be managed like a railroad or a cottonmill.

There are, however, two practicable improvements in the position of college professors which will be of very good effect. Their regular stipend must and will be increased, and the repetitions which now harass them must be diminished in number. It is a strong point of the elective system that, by reducing the size of classes or divisions and increasing the variety of subjects, it makes the professor's labors more agreeable.

Experience teaches that the strongest and most devoted professors will contribute something to the patrimony of knowledge; or if they invent little themselves, they will do something toward defending, interpreting, or diffusing the contributions of others. Nevertheless, the prime business of American professors in this generation must be regular and assiduous class teaching. With the exception of the endowments of the Observatory, the University does not hold a single fund primarily intended to secure to men of learning the leisure and means to prosecute original researches.

The organization and functions of the Board of Overseers deserve the serious attention of all men who are interested in the American method of providing the community with high education through the agency of private corporations. Since 1866 the Overseers have been elected by the Alumni. Five men are chosen each year to serve six years. The body has, therefore, a large and very intelligent constituency, and is rapidly renewed. The ingenious method of nominating to the electors twice as many candidates as there are places to be filled in any year is worthy of careful study as a device of possible application in politics. The real function of the Board of Overseers is to stimulate and watch the President and Fellows. Without the Overseers, the President and Fellows would be a board of private trustees, self-perpetuated and self-controlled. Provided as it is with two governing boards, the University enjoys that principal safeguard of all American governments — the natural antagonism between two bodies of different constitution, powers, and privileges. While having with the Corporation a common interest of the deepest kind in the welfare of the University and the advancement of learning, the Overseers should always hold toward the Corporation an attitude of suspicious vigilance. They ought always to be pushing and prying. It would be hard to overstate the importance of the public supervision exercised by the Board of Overseers. Experience proves that our main hope for the permanence and ever-widening usefulness of the University must rest upon this double-headed organization. The English practice of setting up a single body of private trustees to carry on a school or charity according to the personal instructions of some founder or founders has certainly proved a lamentably bad one; and when we count by generations, the institutions thus established have proved short-lived. The same causes which have brought about the decline of English endowed schools would threaten the life of this University were it not for the existence of the Board of Overseers. These schools were generally managed by close corporations, self-elected, self-controlled, without motive for activity, and destitute of external stimulus and aid. Such bodies are too irresponsible for human nature. At the time of life at which men generally come to such places of trust, rest is sweet, and the easiest way is apt to seem the best way; and the responsibility of inaction, though really heavier, seems lighter than the responsibility of action. These corporations were often hampered by founders' wills and statutory provisions which could not be executed, and yet stood in the way of organic improvements. There was no systematic provision for thorough inspections and public reports thereupon. We cannot flatter ourselves that under like circumstances we should always be secure against like dangers. Provoked by crying abuses, some of the best friends of education in England have gone the length of maintaining that all these school endowments ought to be destroyed, and the future creation of such trusts rendered impossible. French law practically prohibits the creation of such trusts by private persons.

Incident to the Overseers' power of inspecting the University and publicly reporting upon its condition, is the important function of suggesting and urging improvements. The inertia of a massive University is formidable. A good past is positively dangerous, if it make us content with the present, and so unprepared for the future. The present constitution of our Board of Overseers has already stimulated the Alumni of several other New England colleges to demand a similar control over the property-holding board of trustees which has heretofore been the single source of all authority.

We come now to the heart of the University — the Corporation. This board holds the funds, makes appointments, fixes salaries, and has, by right, the initiative in all changes of the organic law of the University. Such an executive board must be small to be efficient. It must always contain men of sound judgment in finance; and literature and the learned professions should be adequately represented in it. The Corporation should also be but slowly renewed; for it is of utmost consequence to the University that the Government should have a steady aim, and a prevailing spirit which is independent of individuals and transmissible from generation to generation. And what should this spirit be? First, it should be a catholic spirit. A university must be indigenous; it must be rich; but, above all, it must be free. The winnowing breeze of freedom must blow through all its chambers. It takes a hurricane to blow wheat away. An atmosphere of intellectual freedom is the native air of literature and science. This University aspires to serve the nation by training men to intellectual honesty and independence of mind. The Corporation demands of all its teachers that they be grave, reverent, and high-minded; but it leaves them, like their pupils, free. A university is built, not by a sect, but by a nation.

Secondly, the actuating spirit of the Corporation must be a spirit of fidelity — fidelity to the many and various trusts reposed in them by the hundreds of persons who, out of their penury or their abundance, have given money to the President and Fellows of Harvard College in the beautiful hope of doing some perpetual good upon this earth. The Corporation has constantly done its utmost to make this hope a living fact. One hundred and ninety-nine years ago, William Pennoyer gave the rents of certain estates in the county of Norfolk, England, that "two fellows and two scholars forever should be educated, brought up, and maintained" in this College. The income from this bequest has never failed; and to-day one of the four Pennoyer scholarships is held by a lineal descendant of William Pennoyer's brother Robert. So a lineal descendant of Governor Danforth takes this year the income of the property which Danforth bequeathed to the College in 1699. The Corporation have been as faithful in the greater things as in the less. They have been greatly blessed in one respect: in the whole life of the Corporation, seven generations of men, nothing has ever been lost by malfeasance of officers or servants. A reputation for scrupulous fidelity to all trusts is the most precious possession of the Corporation. That safe, the College might lose everything else and yet survive; that lost beyond repair, and the days of the College would be numbered. Testators look first to the trustworthiness and permanence of the body which is to dispense their benefactions. The Corporation thankfully receive all gifts which may advance learning; but they believe that the interests of the University may be most effectually promoted by not restricting too narrowly the use to which a gift may be applied. Whenever the giver desires it, the Corporation will agree to keep any fund separately invested under the name of the giver, and to apply the whole proceeds of such investment to any object the giver may designate. By such special investment, however, the insurance which results from the absorption of a specific gift in the general funds is lost. A fund invested by itself may be impaired or lost by a single error of judgment in investing. The chance of such loss is small in any one generation, but appreciable in centuries. Such general designations as salaries, books, dormitories, public buildings, scholarships graduate or undergraduate, scientific collections, and expenses of experimental laboratories, are of permanent significance and effect; while experience proves that too specific and minute directions concerning the application of funds must often fail of fulfilment, simply in consequence of the changing needs and habits of successive generations.

Again, the Corporation should always be filled with the spirit of enterprise. An institution like this College is getting decrepit when it sits down contentedly on its mortgages. On its invested funds the Corporation should be always seeking how safely to make a quarter of a per cent more. A quarter of one per cent means a new professorship. It should be always pushing after more professorships, better professors, more land and buildings, and better apparatus. It should be eager, sleepless, and untiring, never wasting a moment in counting laurels won, ever prompt to welcome and apply the liberality of the community, and liking no prospect so well as that of difficulties to be overcome and labors to be done in the cause of learning and public virtue.

You recognize, gentlemen, the picture which I have drawn in thus delineating the true spirit of the Corporation of this College. I have described the noble quintessence of the New England character — that character which has made us a free and enlightened people; that character which, please God, shall yet do a great work in the world for the lifting up of humanity.

Apart from the responsibility which rests upon the Corporation, its actual labors are far heavier than the community imagines. The business of the University has greatly increased in volume and complexity during the past twenty years, and the drafts made upon the time and thought of every member of the Corporation are heavy indeed. The high honors of the function are in these days most generously earned.

The President of the University is primarily an executive officer; but, being a member of both governing boards and of all the faculties, he has also the influence in their debates to which his more or less perfect intimacy with the University and greater or less personal weight may happen to entitle him. An administrative officer who undertakes to do everything himself will do but little, and that little ill. The President's first duty is that of supervision. He should know what each officer's and servant's work is, and how it is done. But the days are past in which the President could be called on to decide everything from the purchase of a door-mat to the appointment of a professor. The principle of divided and subordinate responsibilities, which rules in government bureaus, in manufactories, and all great companies, which makes a modern army a possibility, must be applied in the University. The President should be able to discern the practical essence of complicated and long-drawn discussions. He must often pick out that promising part of theory which ought to be tested by experiment, and must decide how many of things desirable are also attainable, and what one of many projects is ripest for execution. He must watch and look before — watch, to seize opportunities to get money, to secure eminent teachers and scholars, and to influence public opinion toward the advancement of learning; and look before, to anticipate the due effect on the University of the fluctuations of public opinion on educational problems; of the progress of the institutions which feed the University; of the changing condition of the professions which the University supplies; of the rise of new professions; of the gradual alteration of social and religious habits in the community. The University must accommodate itself promptly to significant changes in the character of the people for whom it exists. The institutions of higher education in any nation are always a faithful mirror in which are sharply reflected the national history and character. In this mobile nation the action and reaction between the University and society at large are more sensitive and rapid than in stiffer communities. The President, therefore, must not need to see a house built before he can comprehend the plan of it. He can profit by a wide intercourse with all sorts of men, and by every real discussion on education, legislation, and sociology.

The most important function of the President is that of advising the Corporation concerning appointments, particularly about appointments of young men who have not had time and opportunity to approve themselves to the public. It is in discharging this duty that the President holds the future of the University in his hands. He cannot do it well unless he have insight, unless he be able to recognize, at times beneath some crusts, the real gentleman and the natural teacher. This is the one oppressive responsibility of the President: all other cares are light beside it. To see every day the evil fruit of a bad appointment must be the cruelest of official torments. Fortunately, the good effect of a judicious appointment is also inestimable; and here, as everywhere, good is more penetrating and diffusive than evil.

It is imperative that the statutes which define the President's duties should be recast, and the customs of the College be somewhat modified, in order that lesser duties may not crowd out the greater. But, however important the functions of the President, it must not be forgotten that he is emphatically a constitutional executive. It is his character and his judgment which are of importance, not his opinions. He is the executive officer of deliberative bodies, in which decisions are reached after discussion by a majority vote. Those decisions bind him. He cannot force his own opinions upon anybody. A university is the last place in the world for a dictator. Learning is always republican. It has idols, but not masters.

What can the community do for the University? It can love, honor, and cherish it. Love it and honor it. The University is upheld by this public affection and respect. In the loyalty of her children she finds strength and courage. The Corporation, the Overseers, and the several faculties need to feel that the leaders of public opinion, and especially the sons of the College, are at their back, always ready to give them a generous and intelligent support. Therefore we welcome the Chief Magistrate of the Commonwealth, the Senators, Judges, and other dignitaries of the State, who by their presence at this ancient ceremonial bear witness to the pride which Massachusetts feels in her eldest university. Therefore we rejoice in the presence of this throng of the Alumni, testifying their devotion to the College which, through all changes, is still their home. Cherish it. This University, though rich among American colleges, is very poor in comparison with the great universities of Europe. The wants of the American community have far outgrown the capacity of the University to supply them. We must try to satisfy the cravings of the select few as well as the needs of the average many. We cannot afford to neglect the Fine Arts. We need groves and meadows as well as barracks; and soon there will be no chance to get them in this expanding city. But, above all, we need professorships, books, and apparatus, that teaching and scholarship may abound.

And what will the University do for the community? First, it will make a rich return of learning, poetry, and piety. Secondly, it will foster the sense of public duty — that great virtue which makes republics possible. The founding of Harvard College was an heroic act of public spirit. For more than a century the breath of life was kept in it by the public spirit of the Province and of its private benefactors. In the last fifty years the public spirit of the friends of the College has quadrupled its endowments. And how have the young men nurtured here in successive generations repaid the founders for their pious care? Have they honored freedom and loved their country? For answer we appeal to the records of the national service; to the lists of the Senate, the cabinet, and the diplomatic service, and to the rolls of the army and navy. Honored men, here present, illustrate before the world the public quality of the graduates of this College. Theirs is no mercenary service. Other fields of labor attract them more and would reward them better; but they are filled with the noble ambition to deserve well of the republic. There have been doubts, in times yet recent, whether culture were not selfish; whether men of refined tastes and manners could really love Liberty, and be ready to endure hardness for her sake; whether, in short, gentlemen would in this century prove as loyal to noble ideas as in other times they had been to kings. In yonder old playground, fit spot whereon to commemorate the manliness which there was nurtured, shall soon rise a noble monument which for generations will give convincing answer to such shallow doubts; for over its gates will be written: "In memory of the sons of Harvard who died for their country." The future of the University will not be unworthy of its past.

5. PRESIDENT LOWELL'S INAUGURAL ADDRESS[1]

October 6, 1909

AMONG his other wise sayings, Aristotle remarked that man is by nature a social animal; and it is in order to develop his powers as a social being that American colleges exist. The object of the undergraduate department is not to produce hermits, each imprisoned in the cell of his own intellectual pursuits, but men fitted to take their places in the community and live in contact with their fellow men.

The college of the old type possessed a solidarity which enabled it to fulfill that purpose well enough in its time, although on a narrower scale and a lower plane than we aspire to at the present day. It was so small that the students were all well acquainted with one another, or at least with their classmates. They were constantly thrown together, in chapel, in the classroom, in the dining-hall, in the college dormitories, in their simple forms of recreation; and they were constantly measuring themselves by one standard in their common occupations. The curriculum, consisting mainly of the classics, with a little mathematics, philosophy, and history, was the same for them all; designed, as it was, not only as a preparation for the professions of the ministry and the law, but also as the universal foundation of liberal education.

In the course of time these simple methods were outgrown. President Eliot pointed out with unanswerable force that the field of human knowledge had long been too vast for any man to compass; and that new subjects must be admitted to the scheme of instruction, which became thereby so large that no student could follow it all. Before the end of the nineteenth century this was generally recognized, and election in some form was introduced into all our colleges. But the new methods brought a divergence in the courses of study pursued by individual students, an intellectual isolation, which broke down the old solidarity. In the larger institutions the process has been hastened by the great increase in numbers, and in many cases by an abandonment of the policy of housing the bulk of the students in college dormitories; with the result that college life has shown a marked tendency to disintegrate, both intellectually and socially.

To that disintegration the overshadowing interest in athletic games appears to be partly due. I believe strongly in the physical and moral value of athletic sports, and of intercollegiate contests conducted in a spirit of generous rivalry; and I do not believe that their exaggerated prominence at the present day is to be attributed to a conviction on the part of the undergraduates, or of the public, that physical is more valuable than mental force. It is due rather to the fact that such contests offer to students the one common interest, the only striking occasion for a display of college solidarity.

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[1] Reprinted from *Harvard Graduates' Magazine*, xviii (Dec. 1909), 211–223.

If the changes wrought in the college have weakened the old solidarity and unity of aim, they have let in light and air. They have given us a freedom of movement needed for further progress. May we not say of the extreme elective system what Edmond Scherer said of democracy: that it is but one stage in an irresistible march toward an unknown goal. We must go forward and develop the elective system, making it really systematic. Progress means change, and every time of growth is a transitional era; but in a peculiar degree the present state of the American college bears the marks of a period of transition. This is seen in the comparatively small estimation in which high proficiency in college studies is held, both by undergraduates and by the public at large; for if college education were now closely adapted to the needs of the community, excellence of achievement therein ought to be generally recognized as of great value. The transitional nature of existing conditions is seen again in the absence, among instructors as well as students, of fixed principles by which the choice of courses of study ought to be guided. It is seen, more markedly still, in the lack of any accepted view of the ultimate object of a college education.

On this last subject the ears of the college world have of late been assailed by many discordant voices, all of them earnest, most of them well-informed, and speaking in every case with a tone of confidence in the possession of the true solution. One theory, often broached, under different forms, and more or less logically held, is that the main object of the college should be to prepare for the study of a definite profession, or the practice of a distinct occupation; and that the subjects pursued should, for the most part, be such as will furnish the knowledge immediately useful for that end. But if so, would it not be better to transfer all instruction of this kind to the professional schools, reducing the age of entrance thereto, and leaving the general studies for a college course of diminished length, or perhaps surrendering them altogether to the secondary schools? If we accept the professional object of college education, there is much to be said for a readjustment of that nature, because we all know the comparative disadvantage under which technical instruction is given in college, and we are not less aware of the great difficulty of teaching cultural and vocational subjects at the same time. The logical result would be the policy of Germany, where the university is in effect a collection of professional schools, and the underlying general education is given in the *Gymnasium*. Such a course has, indeed, been suggested, for it has been proposed to transfer so far as possible to the secondary schools the first two years of college instruction, and to make the essential work of the university professional in character. But that requires a far higher and better type of secondary school than we possess, or are likely to possess for many years. Moreover, excellent as the German system is for Germany, it is not wholly suited to our Republic, which cannot, in my opinion, afford to lose the substantial, if intangible, benefits the nation has derived from its colleges. Surely the college can give a freedom of thought, a breadth of outlook, a training for citizenship, which neither the secondary nor the professional school in this country can equal.

Even persons who do not share this view of a professional aim have often urged that in order to save college education in the conditions that confront us we must reduce its length. May we not feel that the most vital measure for saving the college is not to shorten its duration, but to ensure that it shall be worth saving? Institutions are rarely murdered; they meet their end by suicide. They are not strangled by their natural environment while vigorous; they die because they have outlived their usefulness, or fail to do the work that the world wants done; and we are justified in believing that the college of the future has a great work to do for the American people.

If, then, the college is passing through a transitional period, and is not to be absorbed between the secondary school on the one side and the professional school on the other, we must construct a new solidarity to replace that which is gone. The task before us is to frame a system which, without sacrificing individual variation too much, or neglecting the pursuit of different scholarly interests, shall produce an intellectual and social cohesion, at least among large groups of students, and points of contact among them all. This task is not confined to any one college, although more urgent in the case of those that have grown the largest and have been moving most rapidly. A number of colleges are feeling their way toward a more definite structure, and since the problem before them is in many cases essentially the same, it is fortunate that they are assisting one another by approaching it from somewhat different directions. What I have to say upon the subject here is, therefore, intended mainly for the conditions we are called upon to face at Harvard.

It is worth our while to consider the nature of an ideal college as an integral part of our University; ideal, in the sense not of something to be exactly reproduced, but of a type to which we should conform as closely as circumstances will permit. It would contemplate the highest development of the individual student — which involves the best equipment of the graduate. It would contemplate also the proper connection of the college with the professional schools; and it would adjust the relation of the students to one another. Let me take up these matters briefly in their order.

The individual student ought clearly to be developed so far as possible, both in his strong and in his weak points, for the college ought to produce, not defective specialists, but men intellectually well rounded, of wide sympathies and unfettered judgment. At the same time they ought to be trained to hard and accurate thought, and this will not come merely by surveying the elementary principles of many subjects. It requires a mastery of something, acquired by continuous application. Every student ought to know in some subject what the ultimate sources of opinion are, and how they are handled by those who profess it. Only in this way is he likely to gain the solidity of thought that begets sound thinking. In short, he ought, so far as in him lies, to be both broad and profound.

In speaking of the training of the student, or the equipment of the graduate, we are prone to think of the knowledge acquired; but are we not inclined to lay too much stress upon knowledge alone? Taken by itself it is a part, and not the most vital part, of education. Surely the essence of a liberal education consists in an attitude of mind, a familiarity with methods of thought, an ability to use information rather than in a memory stocked with facts, however valuable such a storehouse may be. In his farewell address to the alumni of Dartmouth, President Tucker remarked that 'the college is in the educational system to represent the spirit of amateur scholarship. College students are amateurs, not professionals.' Or, as President Hadley is fond of putting it: 'The ideal college education seems to me to be one where a student learns things that he is not going to use in after life, by methods that he is going to use. The former element gives the breadth, the latter element gives the training.' [1]

But if this be true, no method of ascertaining truth, and therefore no department of human thought, ought to be wholly a sealed book to an educated man. It has been truely said that few men are capable of learning a new subject after the period of youth has passed, and hence the graduate ought to be so equipped that he can grasp effectively any problem with which his duties or his interest may impel him to deal. An undergraduate, addicted mainly to the classics, recently spoke to his adviser in an apologetic tone of having elected a course in natural science, which he feared was narrowing. Such a state of mind is certainly deplorable, for in the present age some knowledge of the laws of nature is an essential part of the mental outfit which no cultivated man should lack. He need not know much, but he ought to know enough to learn more. To him the forces of nature ought not to be an occult mystery, but a chain of causes and effects with which, if not wholly familiar, he can at least claim acquaintance; and the same principle applies to every other leading branch of knowledge.

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[1] *Annual Report*, 1909, p. 22.

I speak of the equipment, rather than the education, of a college graduate, because, as we are often reminded, his education ought to cease only with his life, and hence his equipment ought to lay a strong foundation for that education. It ought to teach him what it means to master a subject, and it ought to enable him to seize and retain information of every kind from that unending stream that flows past every man who has the eyes to see it. Moreover, it ought to be such that he will be capable of turning his mind effectively to direct preparation for his lifework, whatever the profession or occupation he may select.

This brings us to the relation of the college to the professional school. If every college graduate ought to be equipped to enter any professional school, as the *Abiturient* of a German *Gymnasium* is qualified to study under any of the faculties of the university, then it would seem that the professional schools ought to be so ordered that they are adapted to receive him. But let us not be dogmatic in this matter, for it is one on which great divergence of opinion exists. The instructors in the various professional schools are by no means of one mind in regard to it, and their views are of course based largely upon experience. Our Law School lays great stress upon native ability and scholarly aptitude, and comparatively little upon the particular branches of learning a student has pursued in college. Any young man who has brains and has learned to use them can master the law, whatever his intellectual interests may have been; and the same thing is true of the curriculum in the Divinity School. Many professors of medicine, on the other hand, feel strongly that a student should enter their school with at least a rudimentary knowledge of those sciences, like chemistry, biology and physiology, which are interwoven with medical studies; and they appear to attach greater weight to this than to his natural capacity or general attainments. Now that we have established graduate schools of engineering and business administration, we must examine this question carefully in the immediate future. If the college courses are strictly untechnical, the requirement of a small number of electives in certain subjects, as a condition for entering a graduate professional school, is not inconsistent with a liberal education. But I will acknowledge a prejudice that for a man who is destined to reach the top of his profession a broad education, and a firm grasp of some subject lying outside of his vocation, are a vast advantage; and we must not forget that in substantially confining the professional schools at Harvard to college graduates we are aiming at the higher strata in the professions.

The last of the aspects under which I proposed to consider the college is that of the relation of undergraduates to one another; and first on the intellectual side. We have heard much of the benefit obtained merely by breathing the college atmosphere, or rubbing against the college walls. I fear the walls about us have little of the virtue of Aladdin's lamp when rubbed. What we mean is that daily association with other young men whose minds are alert is in itself a large part of a liberal education. But to what extent do undergraduates talk over things intellectual, and especially matters brought before them by their courses of study? It is the ambition of every earnest teacher so to stimulate his pupils that they will discuss outside the classroom the problems he has presented to them. The students in the Law School talk law interminably. They take a fierce pleasure in debating legal points in season and out. This is not wholly with a prospect of bread and butter in the years to come; or because law is intrinsically more interesting than other things. Much must no doubt be ascribed to the skill of the faculty of the Law School in awakening a keen competitive delight in solving legal problems; but there is also the vital fact that all these young men are tilling the same field. They have their stock of knowledge in common. Seeds cast by one of them fall into a congenial soil, and like dragon's teeth engender an immediate combat.

Now no sensible man would propose to-day to set up a fixed curriculum in order that all undergraduates might be joint tenants of the same scholastic property; but the intellectual estrangement need not be so wide as it is. There is no greater pleasure in mature life than hearing a specialist talk, if one has knowledge enough of the subject to understand him, and that is one of the things an educated man ought so far as possible to possess. Might there not be more points of intellectual contact among the undergraduates, and might not considerable numbers of them have much in common?

A discussion of the ideal college training from these three different aspects, the highest development of the individual student, the proper relation of the college to the professional school, and the relation of the students to one another, would appear to lead in each case to the same conclusion: that the best type of liberal education in our complex modern world aims at producing men who know a little of everything and something well. Nor, if this be taken in a rational, rather than an extreme, sense, is it impossible to achieve within the limits of college life. That a student of ability can learn one subject well is shown by the experience of Oxford and Cambridge. The educational problems arising from the extension of human knowledge are not confined to this country; and our institutions of higher learning were not the first to seek a solution for them in some form of election on the part of the student. It is almost exactly a hundred years ago that the English universities began to award honors upon examination in special subjects; for although the mathematical tripos at Cambridge was instituted sixty years earlier, the modern system of honor schools, which has stimulated a vast amount of competitive activity among undergraduates, may be said to date from the establishment of the examinations in *Literis Humanioribus* and in mathematics and physics at Oxford in 1807. The most popular of the subjects in which honors are awarded are not technical, that is, they are not intended primarily as part of a professional training; nor are they narrow in their scope; but they are in general confined to one field. In short they are designed to ensure that the candidate knows something well; that he has worked hard and intelligently on one subject until he has a substantial grounding in it.

For us this alone would not be enough, because our preparatory schools do not give the same training as the English, and because the whole structure of English society is very different from ours. American college students ought also to study a little of everything, for if not there is no certainty that they will be broadly cultivated, especially in view of the omnipresent impulse in the community driving them to devote their chief attention to the subjects bearing upon their future career. The wise policy for them would appear to be that of devoting a considerable portion of their time to some one subject, and taking in addition a number of general courses in wholly unrelated fields. But instruction that imparts a little knowledge of everything is more difficult to provide well than any other. To furnish it there ought to be in every considerable field a general course, designed to give to men who do not intend to pursue the subject further a comprehension of its underlying principles or methods of thought; and this is by no means the same thing as an introductory course, although the two can often be effectively combined. A serious obstacle lies in the fact that many professors, who have reaped fame, prefer to teach advanced courses, and recoil from elementary instruction — an aversion inherited from the time when scholars of international reputation were called upon to waste their powers on the drudgery of drilling beginners. But while nothing can ever take the place of the great teacher, it is nevertheless true that almost any man possessed of the requisite knowledge can at least impart it to students who have already made notable progress in the subject; whereas effective instruction in fundamental principles requires men of mature minds who can see the forest over the tops of the trees. It demands unusual clearness of thought, force of statement and enthusiasm of expression. These qualities have no necessary connection with creative imagination, but they are more common among men who have achieved some measure of success; and what is not less to the point, the students ascribe them more readily to a man whose position is recognized, than to a young instructor who has not yet won his spurs. Wherever possible, therefore, the general course ought to be under the charge of one of the leading men in the department, and his teaching ought to be supplemented by instruction, discussion and constant examination in smaller groups, conducted by younger men well equipped for their work. Such a policy brings the student, at the gateway of a subject, into contact with strong and ripe minds, while it saves the professor from needless drudgery. It has been pursued at Harvard for a number of years, but it can be carried out even more completely.

We have considered the intellectual relation of the students to one another and its bearing on the curriculum, but that is not the only side of college life. The social relations of the undergraduates among themselves are quite as important; and here again we may observe forces at work which tend to break up the old college solidarity. The boy comes here sometimes from a large school, with many friends, sometimes from a great distance and almost alone. He is plunged at once into a life wholly strange to him, amid a crowd so large that he cannot claim acquaintance with its members. Unless endowed with an uncommon temperament, he is liable to fall into a clique of associates with antecedents and characteristics similar to his own; or perhaps, if shy and unknown, he fails to make friends at all; and in either case he misses the broadening influence of contact with a great variety of other young men. Under such conditions the college itself falls short of its national mission of throwing together youths of promise of every kind from every part of the country. It will, no doubt, be argued that a university must reflect the state of the world about it; and that the tendency of the times is toward specialization of functions, and social segregation on the basis of wealth. But this is not wholly true, because there is happily in the country a tendency also toward social solidarity and social service. A still more conclusive answer is that one object of a university is to counteract rather than copy the defects in the civilization of the day. Would a prevalence of spoils, favoritism or corruption in the politics of the country be a reason for their adoption by universities?

A large college ought to give its students a wide horizon, and it fails therein unless it mixes them together so thoroughly that the friendships they form are based on natural affinities, rather than similarity of origin. Now these ties are formed most rapidly at the threshold of college life, and the set in which a man shall move is mainly determined in his Freshman year. It is obviously desirable, therefore, that the Freshmen should be thrown together more than they are now.

Moreover the change from the life of school to that of college is too abrupt at the present day. Taken gradually, liberty is a powerful stimulant; but taken suddenly in large doses, it is liable to act as an intoxicant or an opiate. No doubt every boy ought to learn to paddle his own canoe; but we do not begin the process by tossing him into a canoe, and setting him adrift in deep water, with a caution that he would do well to look for the paddle. Many a well-intentioned youth comes to college, enjoys innocently enough the pleasures of freedom for a season, but released from the discipline to which he has been accustomed, and looking on the examinations as remote, falls into indolent habits. Presently he finds himself on probation for neglect of his studies. He has become submerged, and has a hard, perhaps unsuccessful, struggle to get his head above water. Of late years we have improved the diligence of Freshmen by frequent tests; but this alone is not enough. In his luminous Phi Beta Kappa oration, delivered here three months ago, President Wilson dwelt upon the chasm that has opened between college studies and college life. The instructors believe that the object of the college is study, many students fancy that it is mainly enjoyment, and the confusion of aims breeds irretrievable waste of opportunity. The undergraduate should be led to feel from the moment of his arrival that college life is a serious and many-sided thing, whereof mental discipline is a vital part.

It would seem that all these difficulties could be much lessened if the Freshmen were brought together in a group of dormitories and dining-halls, under the comradeship of older men, who appreciated the possibilities of a college life, and took a keen interest in their work and their pleasures. Such a plan would enable us also to recruit our students younger, for the present age of entrance here appears to be due less to the difficulty of preparing for the examination earlier, than to the nature of the life the Freshman leads. Complaints of the age of graduation cause a pressure to reduce the length of the college course, and with it the standard of the college degree. There would seem to be no intrinsic reason that our school boys should be more backward than those of other civilized countries, any more than that our undergraduates should esteem excellence in scholarship less highly than do the men in English universities.

The last point is one that requires a word of comment, because it touches the most painful defect in the American college at the present time. President Pritchett has declared that 'it is a serious indictment of the standards of any organization when the conditions within it are such that success in the things for which the organization stands no longer appeal effectively to the imaginations of those in it.'[1] We may add that, even in these days, indictment is sometimes followed by sentence and execution. No one will deny that in our colleges high scholarship is little admired now, either by the undergraduates or by the public. We do not make our students enjoy the sense of power that flows from mastery of a difficult subject, and on a higher plane we

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1. 'The College of Freedom and the College of Discipline,' *Atlantic Monthly* (November, 1908), p. 609.

do not make them feel the romance of scholarly discovery. Every one follows the travels of a Columbus or a Livingstone with a keen delight which researches in chemistry or biology rarely stir. The mass of mankind can, no doubt, comprehend more readily geographical than scientific discovery, but for the explorer himself it would be pitiful if the joy of the search depended on the number of spectators, rather than on zeal in his quest.

America has not yet contributed her share to scholarly creation, and the fault lies in part at the doors of our universities. They do not strive enough in the impressionable years of early manhood to stimulate intellectual appetite and ambition; nor do they foster productive scholarship enough among those members of their staffs who are capable thereof. Too often a professor of original power explains to docile pupils the process of mining intellectual gold, without seeking nuggets himself, or when found showing them to mankind. Productive scholarship is the shyest of all flowers. It cometh not with observation, and may not bloom even under the most careful nurture. American universities must do their utmost to cultivate it, by planting the best seed, letting the sun shine upon it, and taking care that in our land of rank growth it is not choked by the thorns of administrative routine.

If I have dwelt upon only a small part of the problems of the university; if I have said nothing of the professional and graduate schools, of the Library, the Observatory, the laboratories, the museums, the gardens, and the various forms of extension work, it is not because they are of less importance, but because the time is too short to take up more than two or three pressing questions of general interest. The university touches the community at many points, and as time goes on it ought to serve the public through ever increasing channels. But all its activities are more or less connected with, and most of them are based upon, the college. It is there that character ought to be shaped, that aspirations ought to be formed, that citizens ought to be trained, and scholarly tastes implanted. If the mass of undergraduates could be brought to respect, nay, to admire, intellectual achievement on the part of their comrades, in at all the measure that they do athletic victory; if those among them of natural ability could be led to put forth their strength on the objects which the college is supposed to represent; the professional schools would find their tasks lightened, and their success enhanced. A greater solidarity in college, more earnestness of purpose and intellectual enthusiasm, would mean much for our nation. It is said that if the temperature of the ocean were raised, the water would expand until the floods covered the dry land; and if we can increase the intellectual ambition of college students, the whole face of our country will be changed. When the young men shall see visions, the dreams of old men will come true.

6. TABLES OF GROWTH

SUMMARY FINANCIAL STATEMENT[1]

YEAR ENDED AUGUST 31, 1869

Endowment $2,387,232.77

Income from		Expenditure:	
Investments	$200,499.72	Salaries	$122,597.49
Tuition	67,051.13	Awards to Students	12,694.22
Term-bills	78,928.74	Annuities	10,390.78
Miscellaneous	1,163.78	Miscellaneous	124,722.12
Gifts Current Use	529.19		

YEAR ENDED JULY 31, 1889

Endowment $6,761,943.23

Income from		Expenditure:	
Investments	$713,883.05	Salaries	$430,773.57
Tuition	350,139.46	Awards to Students	73,656.27
Term-bills	91,090.78	Annuities	11,053.44
Miscellaneous	22,403.91	Miscellaneous	433,572.92
Gifts Current Use	124,226.75		

YEAR ENDED JULY 31, 1909

Endowment $22,716,759.24

Income from		Expenditure:	
Investments	$966,113.55	Salaries	$944,649.02
Tuition	650,729.84	Awards to Students	137,902.68
Term-bills	160,687.94	Annuities	34,185.12
Miscellaneous	75,524.90	Miscellaneous	1,562,199.19
Gifts Current Use	282,290.44		

YEAR ENDED JUNE 30, 1928

Endowment $86,702,875.76

Income from		Expenditure:	
Investments	$5,044,921.22	Salaries	$3,194,422.96
Tuition	2,400,033.09	Awards to Students	393,671.09
Term-bills	1,483,578.85	Annuities	370,038.76
Miscellaneous	901,275.18	Miscellaneous	6,631,807.63
Gifts Current Use	1,809,906.67		

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[1] Furnished by the Treasurer's Office.

NUMBERS OF OFFICERS AND STUDENTS, 1868-1929[1]

		1868–69	1878–79	1888–89	1898–99	1908–09	1919–20	1928-29
Teachers of professorial grade		45	70	90	134	194	258	469
Other teachers and research fellows		14	65	108	277	416	514	768
Other officers		5	28	47	55	96	151	197
Undergraduates	Harvard Coll.	529	834	1180	1851	2238	2602	3289
	Scient. School	41	17	35	415	39	136	197
Students in other departments		480	475	684	1646	1605	2527	4572

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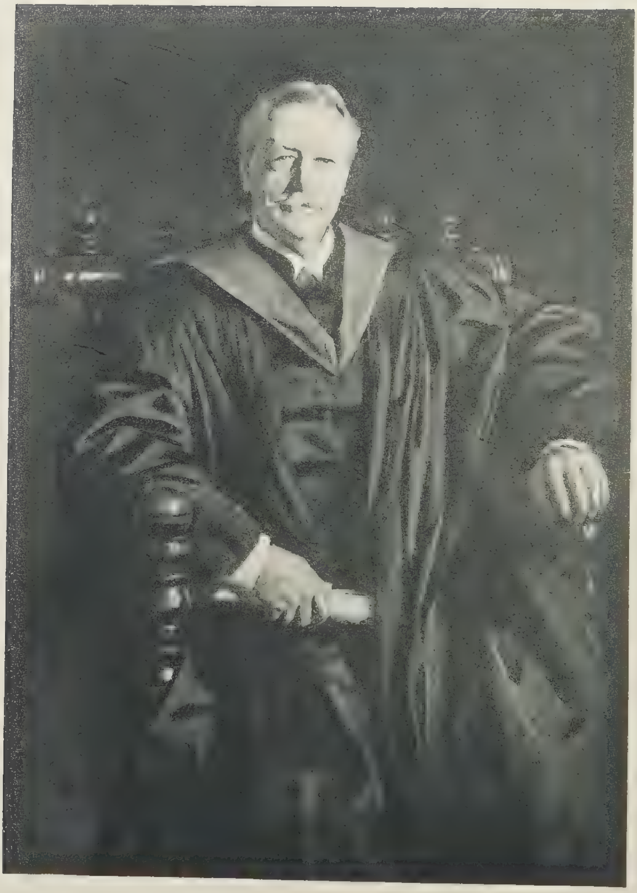
[1] Not including the Governing Boards or the students in Summer Schools.



A. Lawrence Lowell

I

THE DEVELOPMENT OF THE UNIVERSITY

1869–1929

I. PHILOSOPHY

1870–1929

By George Herbert Palmer, LL.D.
Alford Professor of Natural Religion, Moral Philosophy, and Civil Polity, Emeritus
and
Ralph Barton Perry, Ph.D.
Professor of Philosophy

1. Personnel[1]

MANY men of mark have been connected with the teaching of philosophy at Harvard.[2] Levi Hedge, the father of the still better known Frederick H. Hedge, was a professor here from 1810 to 1832; James Walker from 1838 to 1853, when he became President of the University. Francis Bowen, after winning repute by his forcible editing of the North American Review, followed James Walker as Alford Professor and held that chair from 1853 to 1889. Not only did he, like his predecessor, edit many texts of the Scotch philosophers but, what was rarer in those days, he wrote original works on metaphysics, logic, and ethics. This section of my paper, however, is not meant to deal with these notables of the past, but with a later group who have made their names known to all men.

I happened to be connected with this group earlier than any other member. After two years of graduate study in Germany, I became a Tutor in Greek here in 1870 and two years later an Instructor in Philosophy. My assistant professorship came in 1873 and the professorship in 1883. I have therefore watched the entire development of the Department and have had a share in shaping its policies. Up to the time of my resignation in 1913, I had as colleagues the following professors, named in the order of seniority: William James (b. 1842), 1880–1910; Josiah Royce (b. 1855), 1882–1916; George Santayana (b. 1863), 1889–1912; Hugo Münsterberg (b. 1863), 1892–1916; Ralph Barton Perry (b. 1876), appointed 1902. It was the first well-rounded staff for teaching philosophy organized in this country and was made up of extraordinary men, too eminent for praise. In this section I attempt to describe the impression their diverse characters made.

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[1] This section is by Professor Palmer.

[2] For an account of the period before 1869, see Benjamin Rand, 'Philosophical Instruction in Harvard University from 1636 to 1906,' *Harvard Graduates' Magazine*, xxxvii, (1928) 29–46, 188–200.

James

William James showed among us the same surprising, rich, brilliant, and profitable variety of speech and act which appeared in his home, his books, and his championship of an unpopular cause. His nature was so abundant and original that it never became standardized or usual. We, who met him most intimately, found in him every day something fresh to wonder at and admire. I might then properly enough decline the work of description and say that James was indescribable. But I cannot content myself so. Such a man claims some personal portraiture. I will set down a few random recollections of such sayings and incidents, slight in themselves, as bear his mark. The connected history of his life, discussion of his philosophy, and criticism of his many books, I leave to others. Mine is the pleasanter, if harder, task of setting forth an exceptionally engaging personality.

Whenever that alert figure comes to my mind — he of the handsome face, upright bearing, energetic movement, swift step, and tempered voice — there always comes with it the adjective *manly*. In every tense fibre of his being James was a man, one of his own plural centres of creative causation, a being unconstrained by the surrounding world, master of himself and it, happy in subjecting its complicated and interesting enginery to the control of his own large powers. How large those powers were he knew well, but did not exaggerate. He treated them respectfully, cultivated them carefully, and joyously sent them forth on errands for the public good. His own stamp was on all he thought, did, or said. I doubt if he ever knew fear, vanity, or social constraint, or if a sense of incompetence ever held him back from what he wished to do. Yet courage did not blind him. When he was in Florence, writing Gifford Lectures, he was well aware that his heart might stop its beating any day. Yet he wrote on. Each fortnight he and I exchanged letters. His were full of his usual charm, playfulness, and eager interest in all the world was doing, though in a few closing sentences he usually acknowledged his peril. A similar coolness was shown in small things. Once, when lecturing to a large class on formal logic, he was caught in the intricacies of mood and figure and for the moment puzzled. Merely remarking, 'You will have to wait a few minutes,' he turned his back to the class, his face to the wall, and after a brief meditation, turning back, went on with his lecture as if nothing had happened.

Commonly one so indifferent and masterful is apt to neglect social amenities. But James had a delicate consideration of others, an observant tactfulness in putting all at ease. Few persons are habitually so kind. In consequence a troop of cranks attended him through life, in each of whom he found some merit and — more costly — some need. His last paper was an attempt to sift grains of gold out of a muddy stream. What outlays of time and money he spent on half-baked philosophers! And how keen was the advice he gave, if only they had had the wit to take it! When an aspiring Sophomore brought him his programme of study for the following year with only philosophical electives on it, James turned from him with disgust. 'Jones, don't you philosophize on an empty stomach!' — a rebuke too harsh for older dreamers. To them he would patiently listen, gently suggest corrective reading, and try to arrange for them opportunities for lectures or publication. His judgment of men was not good; it was corrupted by kindness. In our Committee, when voting on candidates for the higher degrees, he generally favored the merciful side. 'Of course Smith is n't a genius. But, poor devil, how he has worked!' His overestimate of Charles Peirce, and too ample acknowledgement of his own debt to Peirce's thought, I believe to have sprung quite as much from pity as from admiration.[1]

This inclination toward the under-dog, and his insistence on keeping the door open for every species of human experiment, sometimes brought James into alliance with causes which his social set looked on with disfavor. But friendship never dulled his sense of justice nor his zeal in vindicating it. When on one occasion the doctors, like trade-unionists, were making one of their periodical assaults on Christian Science, James appeared at the State House arguing against his natural friends.[2] The act was highly repugnant to him, exhausting even, but he did not hesitate. Or, again, he never concealed from himself how large a part fraud and self-deception play in spiritualism. He and I, as members of a committee of the Psychical Research Society, attended 'cabinet séances' every Saturday for an entire winter, and at the close reported that in our opinion all these materializing phenomena were fraudulent. Still, discrimination was necessary. The following year he invited Mrs. Piper to give a series of trance interviews at his house; and he believed — as did I — that there was significant psychological matter in her visions. Shortly before he died I asked him if he was convinced that beings of another world could communicate with us. He said he was not. Certainly many strange phenomena of our time could be well explained on that hypothesis. But there was also strong adverse evidence, and he was unwilling to treat the subject as a closed question. Closed questions and the many varieties of scientific obscurantism were abhorrent to him and never failed to call forth his energetic, if sometimes comical, protest. Once, long before the days of spelling reform, he came to me with, 'Is n't it abominable that everybody is expected to spell in the same way? Let us get a dozen influential persons to agree each to spell after his own fashion and so break up this tyranny of the dictionary.' I had to say that my philistine soul preferred order to oddity.

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[1] See, however, page 32 below, indicating that the present Department's estimate of Peirce agrees with James rather than Palmer. S.E.M.

[2] This was March 2, 1898. James appeared against a bill drafted by the State Board of Registration in medicine, making it unlawful to practice medicine without a certificate from the Board. There is nothing to indicate that the bill was aimed speci-

Yet no one ever called James odd or bumptious. Self-assertion and loose radicalism were alien to his beauty-loving and serious temperament. His bearing and utterance were always quiet and distinguished. Only he insisted on using his own eyes and mind, and thought the best contribution he could make to the sleepy world was a pungent statement of just how things looked to him. His work in the classroom was uneven, his lectures — somewhat dependent on mood — often lacking continuity. If a student did not immediately 'catch on' he might go from one of them no richer than he came. But the same student next week was sure to be stirred by some passage so striking and searching that its truth became henceforth a veritable part of his mind and a way was opened to a whole new tract of formative thought. Few teachers have had more grateful pupils than James.

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fically at Christian Scientists, although as drafted it would have made their efforts to heal unlawful. S. E. M.

On the rare occasions when he spoke in Faculty or Committee meetings it was usually with a hesitation compounded in about equal measure of modesty, punctilious truthfulness, and literary exactitude. What he said was important, and some shining phrase would ultimately carry the meaning home. So, too, in his writing. His search for the right word was as relentless as that of Flaubert. It filled with corrections the manuscript of his books. But who among our writers has lodged in the public mind so many subtle thoughts on difficult subjects? Whether we agree or dissent, with what delight we read his pages! The famous saying is just: Of the pair of extraordinary brothers, the psychologist wrote like a novelist, the novelist like a psychologist. William James's style may not be classical. Smoothness and easy flow he did not value. But their glorious opposites march superb — force, unexpectedness, epigram, coruscating abundance. His, too, is perfect frankness and a command of all the resources of the language. A friend who makes many public addresses tells me his test of a good one is whether he 'wallowed,' that is, moved unobstructedly, through his matter as the whale does through the sea, twisting and turning at his pleasure, tossing up foam for mere sport, and plunging or rising as the fancy strikes. James always wallowed.

Among his colleagues, there was a hearty tolerance of divergent beliefs. James accepted the principle no less for the workings of his own mind. Consistency was counted negligible, fidelity to facts the sole obligation. While his mind was certainly hospitable to an astonishing variety of ideas which are usually thought to conflict, it was a sane and usually evolutional variety, where the later did not forget the earlier. There was far more order and consecutiveness in him than he ever claimed, perhaps more than he himself saw. It is true that so soon as he had seen anything through, his interest flagged. To hold attraction for him a subject must offer opportunity for adventure and exploration. In the College he began his teaching with comparative anatomy, but soon found bones and muscles things of no consequence apart from functions, and so crossed to physiology. He had been engaged with this but a short time when he announced to me that bodily functions were merely subsidiary to mental and could be understood only from the point of view of psychology. Accordingly he came over into our Department, gave delightful instruction for several years to large courses of beginners, led a little band of graduates in psychological research, and amused his leisure with building up his monumental book. But when this was published he refused all further teaching of psychology. 'Nasty little subject! Nothing in it! All one cares to know lies outside!' He had the title of his professorship changed and declared he would leave Harvard if obliged to continue as director of its laboratory. He now turned to epistemology, metaphysics, religion, carrying into all his later fields the acquisitions and training of the old. With all its brilliancy, his was no flippant, loose, or disorderly mind, but one of untiring advance. He would not rest at any spot attained, nor even notice conventional restraints; but after studying the discoveries of others, would sail uncharted seas, his own originality his compass.[1]

The general direction of his intellectual movement I am inclined to think was shaped by reaction from two strong opposing influences of his youth. Everybody knows how philosophers divide over mind and matter and the importance to be attached to their seeming contrast. The extreme empiricist holds that to the constitution of the physical world, as manifested in its steadfast laws, all our knowledge is to be referred; while the idealist finds in laws of mind the ultimate reality and regards material phenomena as but exhibits of their working. Naturally between these extreme views fall many varieties. Now the father of William James, a student of Swedenborg, was loved and honored by him profoundly. The son has written an exquisite sketch of the father's life and character. But James grew up believing that the powers of that admirable man had been hindered in efficiency, if not in growth, by a mystical idealism. He came, therefore, to dread such blinding beliefs for himself. In early manhood, too, he formed a close acquaintance with Chauncey Wright, a powerful personality and intrepid thinker, who, following J. S. Mill, carried agnosticism to an extreme beyond that master. For a time James found in Wright's hard empiricism a welcome escape from the idealism which had oppressed him. It gave close contact with the actual world. But by degrees its avoidance of ultimate issues and restriction to mere fact exasperated him. Expressing to me his aversion from a philosophy which so emptied life of significance, he exclaimed: 'Chauncey is the damnedest rationalist that ever I saw.'

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[1] See also Professor Perry's chapter on Psychology, in this volume.

WILLIAM JAMES

JOSIAH ROYCE

Henceforth he seemed to oscillate between these two gulfs, making it his daily prayer that he might fall into neither. Twice he ventured up to the idealist edge and looked on the devouring flood below. One winter Dr. W. T. Harris presided over an informal philosophical club in Boston for the reading of Hegel. James was a member, but I do not think he obtained anything from the strange jargon. Again, a few years later he attended a seminary of mine on Hegel's Logic, and once more found it intolerable and incomprehensible. He washed his hands of the pernicious stuff in his amusing paper on 'Some Hegelisms.' But I thought it always held a terrifying fascination for him. Though he called his philosophy 'Radical Empiricism' and liked to try how complete a world might be constructed by ingenious manipulation of elements of experience, yet to the last he kept ample room in his empiric universe for spiritual forces. Man is free. An approachable God exists, reverence for whom is the beginning of wisdom, and religion the most urgent of human concerns. He himself was a peculiarly devout man and, though living at a distance, liked to begin his day with the service at Appleton Chapel.

Perhaps the grounds of endearment, and its long reach beyond admiration, must always remain unstatable. They certainly appear but slenderly in this meagre sketch. I can only say that we, who for more than thirty years were blest with James's presence, loved him with increasing fervor. We found in him a masterful type of human being, developed almost to perfection. We found an ever fresh and genial companion, of whom we could say with Chaucer that 'dulness was of him y-drad.' We found the tenderest of friends, who was at our side in every affliction, great or small. We found a noble soul, high-bred and democratically minded, incapable of doing anything to be seen of men, but who, perceiving that our age stands in extreme need of patient thought and lucid speech, earned the gratitude of two continents by what he gave. Who that came close to such a being could fail to love? In him there was nothing to excuse.

Royce

Josiah Royce was one of the glories of three universities — California, Johns Hopkins, Harvard. His thought is already absorbed into the mind of the race. To depict the great philosopher in due proportions is the work of another time, place, and writer. The present paper has a narrower and more personal aim. We teachers work in a way unlike the members of other professions. We constitute a family, which meets each week, and feels its mutual dependence; our successes and failures are interlocked, ourselves enriched by the supplemental traits of one another. When one of us dies, his colleagues mourn more for their own than for the public loss, each sharing with each such bits of remembrance as illustrate the beauty and excellence of the absent friend. In this history of Harvard I would record in a fragmentary and intimate way the affection which thirty-four years bred in me for Royce. He was a picturesque figure, a prodigious scholar, a stimulating teacher, a heroic character, a playful and widely loved friend.

His appearance was strange. His short stocky figure was surmounted by a gigantic round head well sunk in his shoulders. The top of it was sprinkled with red hair, while the strongly freckled face seemed to himself and to every stranger unparalleled in homeliness. The resemblance without and within to Socrates was striking. But no one who knew him well could wish a line of that face changed. It expressed wisdom, modesty, humor. In our hearts we called it beautiful, though those who knew him less could go no further than 'distinguished' or 'original.' His clothes, of no particular fashion, seemed to have as little to do with him as matter with mind. His slowly sauntering gait was characteristic. And if you were short of time, it was not safe to ask him a question, however simple; for you received a lecture from which at least you gathered that truth was never fragmentary but had meaning only through its place in the system of the universe.

Early he was remarkable. We know the poverty and isolation of his boyhood years, and have heard that he moved through those hardships with the same unflinching cheerfulness with which in later years he met public attack, domestic affliction, and failing health. Such hardships would have quenched a less resolute spirit. Parents of slender means bore him in an obscure valley of California in 1855, a time when that state was more cut off from the rest of the world than any other of our Union has ever been. Things of the mind were little regarded by the seekers for gold. The State University did not begin instruction at Berkeley till 1873, but it had Royce already among its students, he taking his bachelor's degree in 1875. Tuition was free, but for 'a timid and ineffective boy,' as he afterwards called himself, discomforts abounded. 'My comrades,' he writes, 'very generally found me disagreeably striking in my appearance, by reason of the fact that I was countrified, quaint, and unable to play boys' games.' To such exuberant and unimaginative youths Royce's perpetual inclination to ask questions and accumulate knowledge seemed as queer as his appearance; but undisturbed, he gathered needed instruction in social customs from those who laughed, moral and mental stimulus from the books of Mill and Spencer, and still more from two great teachers, Edward Rowland Sill, the lucid poet and professor of English, and Joseph Le Conte, the philosophical geologist. His graduation thesis, on the theology of Aeschylus' Prometheus, was so remarkable that it was printed by the University, and it prompted a group of gentlemen to offer the means for his further study in Germany, a welcome aid afterwards scrupulously repaid. At several German universities he received profound influences from Kant and his Romantic followers, from Schopenhauer, from Lotze. Acquaintance with Hegel came many years later. Just as his resources were coming to an end, Johns Hopkins University was founded, and offered Royce one of its four earliest fellowships. He returned to this country and took his doctor's degree at Baltimore in 1878, immediately afterwards accepting an instructorship in rhetoric and logic at the University of California.

Those who know only his later writings may wonder at this appointment. One does not easily imagine Royce correcting compositions. The style we think of as his was not neat and exemplary. Its sentences were usually long and tangled, with a good deal of repetition, and little assistive rhythm. Condensed, brilliant, epigrammatic writing was never his. He needed considerable sea room. His papers seem composed rather for the clarification of his own mind than for that of his reader. In short, his style was rich rather than formal, that of one on whom thoughts were ever crowding, and to whom beauty of phrasing made but a slight appeal. A peculiarly genuine style it was, therefore, convinced and convincing. No one can submit himself to its massive flow without feeling that he is under the guidance of a master — competent, candid, large-thoughted, as large in heart as in brain.

Now it is interesting to see that this volume and rush of style came to Royce through the deepening experience of life. In the beginning his sentences were brief and conformable to pattern. In his third year of teaching he printed a small Primer of Logical Analysis for the Use of Composition Students. It is admirably written, academic in its clearness, conciseness, and attention to the user's needs. I name it to mark the contrast between Royce's early and later styles. But it well illustrates something still more important, which I may call the tenacity of his intellectual growth. He was ever changing, ever constant. In this his first book he treats of a subject on which his thoughts were largely engaged at the time of his death. But how differently the subject was conceived! That was always his mode of progress. He carried his past with him, not dropping early conceptions, but evolving them continually into richer significance. Few minds were more progressive; few more steadfast.

Royce's departure from California gives us our first view of that easy courage which was one of his central traits. The year 1882–83 William James was to spend abroad. He and I reported to President Eliot that we wished Royce to take his place. We had hardly more knowledge of him than a few published papers afforded. As the appointment was only temporary, President Eliot consented, and we invited Royce, offering a thousand dollars for salary and nothing afterwards. James was to return at the close of the year. A poor man, and with a wife and baby, Royce resigned a permanent position and brought his family across the continent. When in later life I asked him how he had dared, he said that risks of this sort were inevitable for one who would go on to power, and were safer the earlier in life they came. In that first year he showed his quality so fully that I offered to provide him a second opportunity by taking the sabbatical absence which had been for some time due me. After two years the entire University was convinced that he could not be spared. He became an Instructor for a third year and in 1885 an Assistant Professor.

But something happened in that third year which showed the moral sensitiveness and heroism of the man. Knowing Royce's slender means, President Eliot suggested to Augustus Lowell that Royce be offered a course of Lowell Lectures, with a fee of a thousand dollars. Royce was summoned to a conference. I met him as he returned. He had refused. Mr. Lowell, probably feeling some misgivings over the strange youth, had told him that the founder's will contained a statement of religious belief to which it was necessary each lecturer should assent. To this Royce demurred. He could accept no creed as a condition of receiving money, nor could he be sure that his own understanding of these doctrines was in accord with that of the founder. Uncomplainingly he returned to poverty, and I do not think ever mentioned the matter to half a dozen persons. We who knew persuaded him to give to the University in public lectures the material he had intended for the Lowell Institute. This was the origin of his Religious Aspect of Philosophy, published in 1885, a book whose freshness, force, and devout spirit gave him a commanding position throughout the country.

Then followed a period of enormous productivity. Benjamin Rand enumerates twenty-three volumes and ninety-four articles written by Royce, and his oral product was hardly less astonishing. For college work he taught more hours than any other member of his department, saying he preferred to do so because in contact with the minds of others he could best formulate his own. Every year he gave numerous lectures, often whole courses, at other colleges and cities. At Aberdeen he gave the Gifford Lectures, at Manchester College, Oxford, the Hibbert Lectures, and from both universities received honorary degrees. For several years he taught in our Summer School. He took but one sabbatical year and few vacations, in the early years seldom went to bed till after midnight, smoked incessantly, and allowed himself little exercise. To bodily conditions he always paid little heed. Feeble as he was left by a serious illness four years before he died, it was during those four years that some of his strongest books were written, a striking instance of scholarly hardihood. To himself he was ever a stern taskmaster, and while perhaps overconsiderate in dealing with earnest students of middling powers, he was exacting with men of capacity, impatient with pretenders, and scornful in exposing careless ignorance. Perhaps his classes did not always follow the intricacy of his lectures, but they knew that something big was going on above them, and were all duly elevated. Each gained his own vista into an unsuspected world, many having their minds and characters re-created in the process, and every year a sufficient number stood ready to elect courses known to be severe.

His large tolerance of those who differed with him had in it nothing of that negative indifferentism which, having no convictions of its own, counts one belief as good as another. He was ever a believer, precise, insistent, and inquiring, his temper constructive and not merely critical. Strikingly original in thought and speech, he never ceased to build, each bit of truth captured being firmly bound up with what had gone before, till one was equally astonished at the range and exactitude of his knowledge. Indeed, whoever talked with him hardly thought of what he knew as knowledge. It was rather a unified outlook on life — spacious, detailed, consecrated, amusing, inexhaustible. All knowledge was his province. Among his specialties were psychology, logic, ethics, metaphysics, the philosophies of nature and religion; he knew — none better — the course which philosophy had taken since its rise; had elaborate acquaintance with mathematics, biology, and most of the natural sciences which relate to man; he wrote a novel and a history of California; music and poetry were the arts that moved him, and he was at home in the literature of England, Germany, France, and Italy. Yet the living man was never lost in the great scholar. The same intellectual impulse which carried him over such vast scholastic fields sent him just as eagerly into the common affairs of the day. His belief in the crimes of Germany, the land of his spiritual birth, pursued him day and night and had considerable influence in bringing about his death. When the quiet scholar stepped on the public platform to speak of the war, his moral passion swayed the entire audience and much of the world outside.

But that moral passion deserves a higher name. It was, indeed, religion, a feeling not merely reverential toward law, but addressed to a person manifested wherever order appears and needing our concurrence to complete that order. In his all-embracing Absolute, Royce found room for our individual existence here and hereafter, for our sins, repentance, atonement, and salvation. Loyalty to this sovereign Person made him one of the most unshakably religious men I have ever known. From organized religion he held aloof, partly because it was his disposition in all things to go his own way, partly, too, through reaction from certain rigidities of his boyhood. But he acknowledged to me that there was something childish in such aversion, and twice in his later years he conducted prayers in Appleton Chapel. Personally he fairly lived with the Eternal, the affairs of time being still counted worth while because in them too can be seen 'bright shoots of everlastingness.' To his happy home came many sorrows, 'afflictions sorted, anguish of all sizes.' And he suffered. Who that knew that tender heart could doubt it? But at the centre of him there was peace. 'Shall not the judge of all the earth do right?' he always seemed to say. Through every experience he walked unperturbed, no fear, no clouded intellect, no check of philosophic humor. I do not believe he was ever known to complain. At one time he was bitterly attacked by a man whose book he had scathingly reviewed. Abusive articles were sent broadcast through the country and the Harvard Corporation was petitioned to remove him. Just at this time his mother died. When I said to him that it was hard to meet two such blows at once, he answered, 'No. Each is bad, but there is a gain in having them together. They lean up against each other, and when I become sore over one, the other gives change.' So did he travel on earth's common way in cheerful godliness. That elfin figure with the unconventional dress and slouching step, that face which blended the infant and the sage, that total personality, as amused, amusing, and intent on righteousness as Socrates himself — happy the University that had for a long time so vitalizing a presence!

Santayana

George Santayana is unique in a variety of ways. In the philosophical menagerie which made up our department he stood somewhat aloof, and was valued the more on that account. When on several occasions he wished to resign and devote himself to writing, it was our urgency which kept him in his chair. I shall expound him best by enumerating successively the points of his uniqueness which most impressed us in daily intercourse.

Fundamental to all was his heritage. He was a Spaniard, born in Madrid of parents who were both Spanish. His mother, having connections with this country, brought Santayana here while he was a boy and here she lived till her death in 1911. He inherited Catholicism too and always kept a sentimental attachment to that faith. A crucifix hung at the head of his bed, though he did not frequent churches of any sort nor object to being called an agnostic. Besides myself he was the only graduate of Harvard College in the Department.

He approached philosophy at a different angle from the rest of us. Aesthetics was his centre. A paraphrase of Tennyson's Prologue to the Palace of Art comes near to describing him:

A glorious being both in heart and brain,
That did love Beauty only (Beauty seen
In all varieties of mould and mind),
And Knowledge for its beauty; or if Good,
Good only for its beauty.

He was always no less a poet than a philosopher. His first book was a small volume of Sonnets and Other Verses (1894); his next, The Sense of Beauty (1896); the long poem Lucifer followed in 1899 with a prose piece, Poetry and Religion, in 1900; then came the last of his long poems in 1901, The Hermit of Carmel, and the prose study of Three Philosophic Poets, Lucretius, Dante, and Goethe, in 1910. All these were volumes of astonishing merit. When in his Selections of 1922 he went through the shorter poems of his early years — rejecting, revising, introducing connected order, and depicting the tragic progress through which intellectual honesty had obliged him to pass — he produced a work which must have a place in the very front rank of the poetry of our time. There is not a word of imitation in it, nor any of the struggle for novelty which distorts much of our poetry; but subtle and lucid originality marks everywhere the beautiful verse.

No wonder then that with such uniqueness Santayana impressed us as an onlooker in the world more than a sharer in its struggle. With nothing in hasty and democratic America had he a part. He had few intimates, and on the death of his mother he felt the last link that bound him to this country broken. He returned to Madrid, only to find its stupor as oppressive as had been the rush of undignified America. In England, where he has since resided, he has captured the public with his marvelous prose style. Its graceful sentences carry a complicated thought too difficult for ordinary pens to express. His Life of Reason (5 vols., 1905–06) was his most serious philosophical undertaking during the period of his American residence; other important volumes, beginning with Scepticism and Animal Faith, have followed since. Yet I must acknowledge a peculiar inaptitude to appreciate these works. Every sentence of his perfumed style charms me, as does the beauty of nearly every paragraph. But when I come to the end of a chapter and try to sum up its conclusions, I do not know what they are. An intellectual fog is on me and I carry little away.

Let no one imagine that such saturation of language with beauty has come about by chance or blind genius. It is the product of severe labor. At the beginning Santayana was a poor teacher. By persistent effort he became about the best we had. Perhaps his dispassionateness made him a specially successful lecturer on the history of philosophy. Each successive thinker presented a special mood with which Santayana imaginatively identified himself. He thus stirred men to enthusiasm who were not much affected by other lecturers, and obtained a large following. His beautiful voice cannot easily be forgotten. There was nothing careless about him — figure, dress, or bearing. He was kind to all, and resembled the ancient Epicureans in a certain austerity of private life, indifference to money, and a constant pursuit of permanent rather than transient enjoyments.

Münsterberg

Hugo Münsterberg was confessed by all to be one of the most brilliant Harvard professors of his time. Yet he had quite as many foes as friends, and these two groups were about equally ardent. They agreed, however, in calling him puzzling. Most of us are that, and about in proportion to our greatness. Or is it that the ordinary man is puzzling too but is of too little consequence to repay the effort to understand? We leave him unexplained. Münsterberg had too wide and deep an influence to be left so. I shall endeavor to tell how he seemed to me to be put together.

His appearance was striking. In no company could he be overlooked. A tall figure, neither stout nor lean but carrying no superfluous flesh; as it were, trimmed for action. The roving, observant blue eye, the springy step, the slight bend in the body in a kind of forward lunge, all suggested an alertness which characterized him throughout. He was all alive, perpetually creative too. At twenty-nine, when he came to Harvard as full professor, he was already a centre of discussion in Germany; for after working with Wundt at Leipzig he became convinced that his teacher's explanation of effort was erroneous and earned his permanent hostility by a masterly analysis of his own. To this paper James was much indebted, and when he grew tired of the laboratory here he called Münsterberg to take his place.

After some hesitation Münsterberg agreed to a tentative acceptance. He obtained a three years leave of absence from his chair at Freiburg and in the summer of 1892 crossed the Atlantic with his wife and two daughters. Three months study of English before starting gave him sufficient command of our language to begin lecturing at the close of September. His rare literary skill and his animated manner always filled his courses with students, though up to the last he spoke with a strong German accent.

These tentative years brought Münsterberg so pronounced a success and such promise of a powerful future that the question of his permanent transfer to this country became serious. To settle it he accepted in 1895 a two years leave of absence offered him, and went back to Freiburg for comparison and deliberation. At the end of two years he was convinced that he would have more advanced students here, that the complexities and rush of American life which usually bewilder foreigners would be congenial to his wide-ranging mind, and that the ambition he had had to win a place in the literature of Germany could begin anew in that of America. To close an epoch he gathered together his many poems and printed them under the name of Hugo Terberg. They are excellent, skillful in technique, imaginative in substance, and passionate with decency. In Cambridge he took a large house, furnished it with a certain splendor, and there began that career of scholar, entertainer, author, orator, and politician which made his name a familiar one from the Atlantic to the Pacific.

And here perhaps some light may be thrown on the 'puzzle' so often found in Münsterberg. His was ever a twofold nature, both sides of him genuine, both followed eagerly, but in themselves somewhat conflicting. He felt allegiance to two countries, though always retaining his German citizenship. He was a profound and capacious scholar, but none the less a popularizer, a producer of books and talks for the million. He loved seclusion and quiet almost as much as he loved the limelight and the front page. His intellect was exceptional in range and penetration, but often one had to think of him as a big boy who had never grown up. He dreamed of bringing Germany and America to a mutual understanding. The genuineness of his regard for America was proved when about the middle of his career he declined a lectureship at Oxford, yielding more salary than he had at Harvard and calling for less work. Still more significant was his refusal a few years later of a call to Kant's chair at Königsberg.

During the World War Münsterberg almost unified himself by a wholesale devotion to German interests. With the German ambassador he wrote propagandist editorials for newspapers all over the country. He was often called a paid German spy, a ludicrous charge in the minds of those who knew him. For money he cared less than any man of my acquaintance, his greatest weakness being desire for praise and public importance. In 1915 his doctor warned him that his heart was in so bad a state that entire rest of mind and body was all that could preserve his life. It was the time of his greatest exertion. He died as he had lived, a willing sacrifice to his country. On December 16, 1916, when he had uttered just two sentences of a lecture at Radcliffe, he fell forward dead.

Personally he was a thoroughly lovable man. In immediate contact with him one came upon a sweet simplicity, a universal kindness. He knew no malice. When those who had been his intimates became open enemies, refusing to notice him on the street, the members of his household were naturally indignant. But he was always finding excuses, 'Probably we should behave just as they do if we saw only what they see.' His generosity knew no bounds. He made his house (7 Ware Street) a resort for homeless students, looked up the penniless, and furnished continual charity to stray fellow-countrymen. Only a fortnight before he died he was called on by a German he had never seen before who for some plausible purpose wanted $500, and got it. He was entirely tolerant too. He and I never had a word of quarrel, though I spoke warmly as a pro-Ally and he with equal warmth as a pro-German. In his daughter's beautiful Life of him these traits and especially his prodigious industry find a suitable setting. To its abiding honor Harvard University in spite of popular clamor left Münsterberg absolute freedom of speech, President Lowell insisting that if we censored certain utterances of a professor we tacitly assumed responsibility for whatever we did not censor.

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Ralph Barton Perry (A.M. 1897) is fortunately still in active service. It would then be unbecoming to analyze his character as I have analyzed our absent colleagues. I will only say that he is a Princeton graduate who took a doctor's degree with us in 1899, and, after teaching philosophy at Williams and Smith, became an Instructor here in 1902. He has declined several flattering calls elsewhere, has been exchange professor both in France and the United States, has put out a stout volume of constructive philosophy every year or two, was one of the initiators of the New Realism, ever a skilful teacher and watchful friend of students. His genial temper has commended him widely outside the Department as well as within it.

Dr. Benjamin Rand (A.B. 1879) has been associated with us almost from the beginning as our Librarian, an erudite aid in philosophic research; he has himself made important contributions to the history of philosophy through the discovery and editing of hitherto unknown works of British philosophers.

Palmer[1]

The retirement of George Herbert Palmer in 1913 was a serious loss to the Department. He was its senior member, most skilful teacher, and wisest counsellor. He had always taken a peculiar interest in the academic side of his vocation, in his relations with colleagues and students, in the relations of the Department to the Faculty and Governing Boards, and in questions of policy within the Department itself. He felt a peculiar responsibility for the Department, nursed it during its infancy and growth, expected great things of it, and thought nothing too good for it. His teaching was remarkable, the more so in view of his physical disabilities. Always frail, he felt obliged to sit during his lectures; and being near-sighted, he could not recognize his students beyond the first few rows of the classroom. Philosophy 4, the course on Ethics which he gave from 1884 until the year of his retirement, was one of the most famous and popular courses in Harvard College.[2] He was no less successful with his introductory course on the History of Philosophy, in which his remarkable lucidity of exposition and vividness of characterization held the attention of several hundred students. Although so largely absorbed in the life of Harvard College, Palmer exer-

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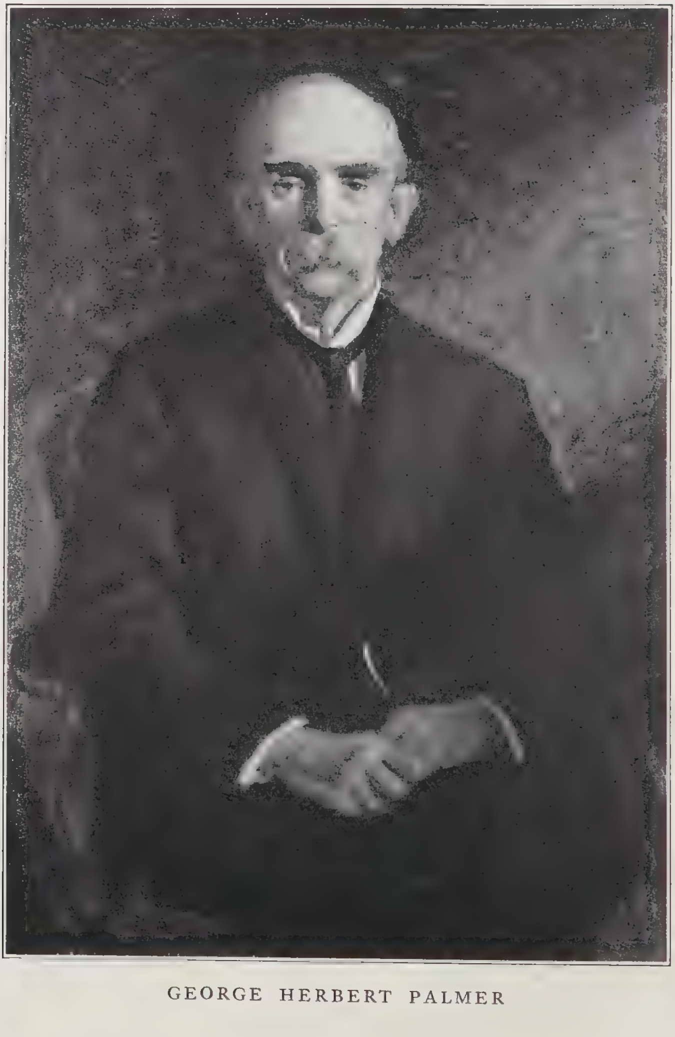
[1] The rest of this section is by Professor Perry.

[2] This course was historical up to 1888–89, systematic after that date.

GEORGE SANTAYANA



GEORGE HERBERT PALMER

cised a wide influence throughout the country by his frequent visits to other colleges and his writings on educational subjects. In the early years of Eliot's administration he took a prominent part in the public controversy over the elective system. Owing to his association with Alice Freeman Palmer he has always felt a special interest in Wellesley College and in the education of women. His essay on 'Self-cultivation in English' has become a classic among teachers and students of composition. His personal influence upon his colleagues and more advanced students has been due to his remarkable self-mastery, to the definiteness and consistency of his judgments, to the clarity and aptness of his speech — and to the range and balance of his culture. Translator of Homer and Sophocles; writer on Shakspere and George Herbert; collector, lover, and reader of the English classics; he has known as have few men of his time how to temper learning with sensibility.

Pupils and Successors

The Alford Professorship of Natural Religion, Moral Philosophy, and Civil Polity, vacated by Palmer in 1913, was held by Royce until his death, and has been held since 1919 by William Ernest Hocking (A.B. 1901), who was called from Yale in 1914. Perry and James Haughton Woods (A.B. 1887), became full professors in 1913. To this group, all of whom were students at Harvard under James, Royce, and Palmer, there have been added three distinguished European scholars. Alfred North Whitehead, F.R.S., was appointed to a professorship in 1924, immediately after retirement from his chair at the University of London. A graduate and Fellow of Trinity College, Cambridge, Whitehead's earlier interest was in mathematics, and he approached philosophy through the middle ground of scientific method and symbolic logic. Since coming to Harvard his interests have centred in metaphysics, and through his originality and fecundity as well as his great personal distinction Whitehead has come to exert a notable influence both at Harvard and in the country at large.

Maurice De Wulf, Professor of Philosophy at the University of Louvain, having been twice a visiting professor at Harvard during the World War, became a part-time professor from 1921 to 1927. Etienne Gilson, Professor of Mediaeval Philosophy at the Sorbonne, came to Harvard in 1926 as French Exchange

Professor, was appointed to a half-time professorship at Harvard in 1927, and served in that capacity for two years before resigning to accept the direction of a new institute for mediaeval studies at the University of Toronto. Though Gilson's membership in the Department was brief, its effects will be lasting, owing to his unusual combination of historical erudition and technique with fresh philosophical insight.

To this group the following younger men have been added in the professorial grades: R. F. A. Hoernlé (S.B. Oxford 1907), who came to Harvard in 1913, but accepted a call to England in 1920;[1] Clarence I. Lewis (A.B. 1906), called from the University of California in 1921, Chairman of the Department in 1927; Ralph Monroe Eaton (A.M. 1915) and Raphael Demos (PH.D. 1916), who have been with us since 1919; Henry Maurice Sheffer (A.B. 1905), appointed lecturer in 1916; Harry A. Wolfson (A.B. 1912), appointed Instructor in Jewish Literature and Philosophy, 1915. Dickinson Sergeant Miller (A.B. 1892), afterwards at Columbia University and the General Theological Seminary, was Instructor in Philosophy from 1899 to 1904; and Benjamin Apthorp Gould Fuller (A.B. 1900), now at the University of Cincinnati, Instructor in Philosophy from 1907 to 1910, and from 1913 to 1919. The introduction of the tutorial system, and the improvement of the quality and rank of assistants in the elementary courses, have made it possible in recent years to increase the number of men appointed to temporary instructorships. These young men have, in almost all cases, already received the doctor's degree. Their appointment greatly enriches the intellectual life of the Department, improves instruction, and makes it possible to try out promising men before advancing them to higher grades.

Over and above its permanent personnel, the Department has profited greatly from its visitors, both Americans and foreigners. Masaharu Anesaki of the University of Tokio was a member of the Department from 1913 to 1915, as Professor of Japanese Literature and Life, and instantly won a place for himself in the hearts of his associates as well as in the curriculum. Bertrand Russell of Trinity College, Cambridge, has twice (1914 and 1917) been a temporary member of the Department, and his visits were extraordinarily stimulating both to his colleagues and to his advanced students. Professors Warner Fite of Princeton, A. W. Moore and E. A. Burtt of Chicago, C. M. Bakewell of Yale, R. C. Lodge of Manitoba, and others have supplied the places of regular members of the Department on leave of absence. The exchange of professors with Germany and with France has been an important means of continuing the European contacts which have been traditional in the Department since the time of James. Professor Wilhelm Ostwald of Leipzig, famous both as a physical chemist and as an exponent of *Naturphilosophie*, was a visiting lecturer in 1905–06, and through William James's interest was invited to give a course for philosophers. Rudolph Eucken, Professor of Philosophy at Jena, was the German Exchange Professor at Harvard in the year 1912–13. From Paris came Emile Boutroux of the Fondation Thiers as Hyde Lecturer in 1910, and Lucien Lévy-Bruhl of the Sorbonne as French Exchange Professor in 1919–20, as well as Gilson in 1926–27.[1]

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[1] Now Professor of Philosophy at the University of Witwatersrand, Johannesburg.

The work of the Department has been facilitated since 1881 by the interest and loyal coöperation of the Visiting Committee appointed at regular intervals by the Board of Overseers. In the early days when Emerson was an Overseer (1867–79), he made frequent personal inspections of the Department's courses, much to the consternation of the lecturers. More recently, under the active chairmanship successively of George B. Dorr, Reginald C. Robbins, Henry James, and Joseph Lee the Visiting Committee has offered counsel on questions of general policy, and has stimulated interest in the Department's needs.

The Sixth International Congress of Philosophy was held at Harvard, September 13–17, 1926, and the Department was largely represented in its organization and direction, as well as in its programme. The Congress numbered 450 active and 275 associate members, of whom upwards of 60 represented countries other than the United States, including all the important countries of Europe, as well as Japan, South Africa, and the Argentine Republic. The headquarters of the Congress were in Smith and Standish Halls, where most of the members coming from a distance were provided with rooms and meals, and enjoyed exceptional opportunities for personal contacts. This being one of the early congresses in which representatives of the Allied and Central Powers met intimately on the neutral ground of learning, it helped materially to restore the international amity of scholars.

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[1] In return, Santayana lectured at the Sorbonne in 1905–06, Münsterberg in Berlin in 1910–11, Woods at the Sorbonne and French Provincial Universities in 1916–18 and 1927–28, and Perry at the French Provincial Universities in 1921–22. Both Hocking and Perry have been Mills Lecturers at the University of California and exchange professors at the western colleges.

2. Organization [1]

My colleagues were all men of genius who independently would have had a deep influence anywhere. But I believe that influence was doubled by certain ethical features of our organization. As these features have attracted little notice, though in my judgment well worth reproducing elsewhere, I name them here.

The former controlling headship of the Department was abandoned. A chairman took the place. This officer called our meetings, presided at them, and was our medium of communication with the President. He was changed every few years. In the course of time most of the professors served in this way and so became acquainted with administrative as well as teaching duties. Occasionally even an assistant professor was chairman. But neither he nor any other professor had authority over the rest. All were equal and independent. When we met for discussion or to draw up our programme of studies for the following year we did so as a company of gentlemen all alike eager to strengthen the Department. If two mentioned the same topic as the subject they proposed for their course on the new programme we talked it over and considered whether we had better double up, as is sometimes well, or fill a vacancy elsewhere. One of the two professors always gladly withdrew, postponing his topic to a later year. The chairman led the discussion and made suggestions but exercised no control. The fact that no professor of ours was a subordinate gave dignity to the position and enabled us to call men of superior grade. I never knew anyone invited to join our staff who refused. This organization through a chairman is now common to all the departments at Harvard.

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[1] This section is by Professor Palmer. Professor Perry contributes the following note: When the present administrative organization of the Faculty of Arts and Sciences by Divisions and Departments went into effect (1891), Professor Palmer became Chairman of the Division of Philosophy. He was succeeded by Royce in 1894, returned to the chairmanship in 1898, and was succeeded by Münsterberg in 1900. In 1906 Social Ethics and Philosophy were distinguished as constituent Departments of the Division, and Perry became Chairman both of the Division and of the Department of Philosophy. From 1913 the Department of Philosophy has been called the Department of Philosophy and Psychology. The more recent chairmen of the Division of Philosophy have been: Woods, 1914; Hocking, 1916; Hoernlé, 1917; Woods, 1919; Lewis, 1927.

We avoided 'breeding in' and directly aimed at diversity in our staff. When a new member was proposed we at once asked whether he had not the same mental attitude as someone we had already. If so, we did not want him. There is therefore no Harvard 'school' of philosophy. As soon as our students leave college they are sure to encounter all sorts of beliefs. We wished them to have a chance to study these beliefs under the guidance of an expert believer and then to have the difficulties in them presented by an expert opponent. This we held accomplishes best the great aim of a college: it leads a student to think for himself, to acquire the mastery of his mind. It so protects his after-years and saves him from the casual opinions of his little circle. We endeavored to train leaders, not followers.

These differences of opinion in our staff were always openly acknowledged. In our lectures we were accustomed to attack each other by name, James forever exposing the follies of the Idealists, particularly Royce and me; Royce in turn showing how baseless Empiricism is, lacking a metaphysical ground. One year James and Royce combined in a course on Metaphysics, Royce occupying the first half-year, James the second. One November Royce asked me to take charge of his advanced course for six weeks while he was lecturing at Aberdeen. I told him that there might be an objection to my doing so in that I dissented from everything he had been saying. He said he was aware of this and for that reason had asked me. He thought my coming would enrich the course. I took it and devoted myself to pulling up all the plants which Royce had carefully set out. When he came home he ordered a thesis on the entire work of the half-year, and he told me it was the best thesis he had ever received.

Our students were not misled by these our attacks on each other. They knew that we were all warm friends. But truth was sacred; and criticism, the surest way of approaching it, was a friendly, not a hostile, process. We wished our students to cultivate the critical habit, learn to be dispassionate, and not permit personal feeling to encroach on intellectual judgments. James has admirably defined philosophy as the obstinate attempt to think clearly; and nowhere is such obstinacy more needed than for purging one's judgment from personal bias. We were glad to be examples of this, of the honor paid to diversity, and of the insistence that infinite reality might be approached from many sides. And what happiness to work under conditions of entire freedom where suspicions were unknown and friendships were profound!

In this connection mention should be made of a change in the attitude of the several departments of the University toward one another. In my early years philosophy was suspicious of science, and science contemptuous of philosophy. Warm cooperation is now the rule. The growth of the College can be met only by letting each department use as much as possible of the work done elsewhere.

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Has this chapter too large a title? What I have described is merely the Department of which I was once a member. Sixteen years have passed since then, probably as eventful as any of the forty years preceding. Those managing the Department have been altogether worthy of its traditions. Yet I say nothing of these years or men. Since the beginning of the war I have had little connection with the organization which was once my life. Its staff and I have the friendliest relations, but personal ones only. For I hold that when an officer's corporate responsibility ceases, interference, advice, even detailed knowledge, should also cease. While then I rejoicingly perceive the great influence in the University and beyond it of the present Harvard Department of Philosophy, I am incompetent to be its historian.

3. Instruction [1]

A survey of the development of instruction in philosophy at Harvard begins properly with the introduction of the elective system, and the strengthening of the staff in the early years of President Eliot's administration. This development may conveniently be considered under four aspects: the diversification of subject-matter, the gradation of courses, the system of tutors and general examinations, and graduate instruction.

(a) *The Diversification of Subject-Matter.* Prior to 1878 the emphasis was placed on standard textbooks, and on the study of the historical classics. James began to teach Philosophy in 1880, and Royce was called to the Department in 1882. Both were independent, constructive thinkers of the first rank, and through their influence the emphasis was rapidly shifted from historical to systematic instruction in metaphysics and philosophy of nature. Palmer, whose teaching had hitherto been largely historical, gave increasing emphasis to his instruction in theoretical ethics. Royce's interest was from the beginning divided between metaphysics and logic, and in the latter field he was one of the pioneers in the transition from the older Aristotelian formal logic to the newer symbolic and epistemological methods. The later appointments of Sheffer, Lewis, and Whitehead, all of them experts in this field, confirmed and increased the emphasis on modern logic, and gave the Department an unquestioned leadership in this field. Santayana and Münsterberg were men of pronounced philosophical originality. Perry and Hocking had been closely associated with James and Royce, and were imbued with the same spirit of independent thinking, as were successive generations of graduate students, many of whom remained for a time as instructors and assistants. Thus there grew up in the Department as its most characteristic mark the idea that the study of philosophy meant the achievement and defense of some philosophical 'system' of one's own. It became both a tradition and a conscious policy to encourage, among both instructors and students, critical and constructive power, diversity, and clash of opinions.

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[1] This section and what follows, excepting the concluding paragraph, is by Professor Perry.

At the same time the History of Philosophy was continuously and effectively taught by Dr. Miller, Dr. Fuller, and others. The courses in the ancient and modern classics, were always regarded as indispensable. Santayana lectured with his characteristic perfection of style on both ancient and mediaeval philosophy, and stimulated among his students a strong interest in the development of European culture. Woods added more rigorous methods of textual and linguistic study, and a remarkable course on Oriental Philosophy. But the fact remains that during the thirty years from 1890 to 1920 the Harvard Department was distinguished by its incitement of students to speculation on their own account, and by its invigorating atmosphere of criticism and controversy.

During the last few years, owing to the influence of Woods, De Wulf, and Gilson, as well as to a natural reaction from the emphasis of the earlier period, there has been an increased emphasis on the historical courses, and a tendency to insist upon a more thorough and accurate textual scholarship. This does not imply the abandonment of the earlier ideals. It remains true that all the older members of the Department are primarily philosophers rather than historians, and that each of them is identified with philosophical doctrines and methods which are peculiarly his own. It remains the policy of the Department to stimulate the students' critical and constructive faculties, to awaken a love of truth, and to tolerate differences.

(b) *Gradation of Courses.* When Philosophy ceased to be a compulsory subject, it proved desirable to arrange courses for elective purposes in an orderly succession of advancement. Courses of the first or lower group have always presented a peculiar problem in philosophy. The difficulty is not one of organization or personnel. Here, as in other departments, the division into sections for the third hour of each week, and the employment of well-qualified assistants, has probably made the instruction as efficient as is possible in large lecture courses. The peculiar problem in the case of philosophy arises from the diversity of its subject-matter. One may approach the study of philosophy by its history, or by an introduction to the problems of metaphysics and ethics, or by an elementary study of logic. Formerly psychology was also conceived as a part of philosophy, and as affording a suitable introduction to it. All these methods have been tried separately and in combination, successively and simultaneously. The problem has been further complicated by the growth of the College, and the adoption in 1910 of the system of 'concentration and distribution.' Philosophy and Mathematics now constitute a group by themselves for purposes of 'distribution,' which means that every undergraduate of Harvard College must take a course in one or the other. We must provide not only instruction which is introductory to higher courses, but also such instruction as may constitute a student's only and sometimes reluctant acquaintance with the field.

After much experimentation, the conclusion has been reached that there is no single elementary course in philosophy which either in method or in content can meet all these requirements. The Department has therefore adopted a flexible plan which provides for a wide range of choice. A student beginning the subject may take a course on the outlines of the History of

Philosophy, ancient and modern. Or he may take a half-course on problems or types of philosophy, and combine this either with elementary logic, or with a half-course of the 'middle group' such as Ethics, Philosophy of Nature, Philosophy of the State, Philosophy of Religion, or History of Philosophy. This mode of combination has had the effect of creating a distinction between relatively elementary and relatively advanced courses within the middle group itself. This group has also, during the last forty years, reflected both the diversification of special systematic fields, and the recent increasing emphasis on history of philosophy.

The requirement of 'concentration' has greatly increased the number of those undergraduates who take four or more courses in the Department. In 1929 there are about ninety 'concentrators,' divided between those who emphasize Philosophy, and those whose special field is Psychology. At the same time there appears to be no diminution in the number of those concentrating in other subjects who take one or more courses in Philosophy or Psychology as free electives.

(c) *Tutors and Divisional Examinations.* The Department has long recognized the value of informal discussion and personal guidance, and has long practised this method, especially in the case of graduate students. Dr. Fuller, who during his residence at Oxford had acquired a great admiration for tutorial instruction, introduced as much of it as he could into his undergraduate teaching at Harvard, and with most satisfactory results. Fortunately, when the present system of tutors and divisional examinations was formally adopted for Philosophy in 1921–22, Eaton and Demos were available as tutors. They have grown up with the system and have shown a special aptitude for it. Tutorial instruction has proved to be peculiarly suited to the teaching of philosophy and psychology, both by its emphasis on discussion, and its adaptability to individual needs in so broad a field. As a result of the new system, many Seniors in Harvard College now reach a stage of advancement equal to that of graduate students. These men not infrequently continue their studies after graduation, and have helped to raise the average quality of candidates for the doctor's degree.

(d) *Graduate Instruction.* In the upper group of courses 'primarily for graduates,' the Department has been notable for the number and success of its 'seminaries.' For many years all the older professors have conducted such courses, numbering from twelve to twenty students, meeting weekly for two hours, and providing an opportunity for the discussion of papers presented by the students themselves. The prominence of the seminary method has been due, no doubt, to the premium put on criticism and originality. In addition to conducting such a seminary, the older members of the Department have in recent years undertaken to guide students by individual conferences ('20' courses) in topics of research not specifically covered by regular courses of instruction.

The present method of examination for the doctor's degree, maintained without radical alteration since 1899, provides for written 'preliminary' examinations, oral 'topical' examinations before a small committee, and a final oral examination before the whole Division. The candidate's thesis is read by a small committee, and, if approved, affords the basis of the final examination.

The number of graduate students in Philosophy and Psychology, which between 1913 and 1923 averaged about 70, has remained since that date between 75 and 100 with slight annual variations. In spite of William James's disparagement of 'The Ph.D. Octopus,' graduate students in Philosophy and Psychology, having college teaching as their prospective means of livelihood, are almost invariably candidates for this degree. Beginning with Stanley Hall in 1878, the Ph.D. in Philosophy and Psychology was awarded intermittently up to 1893, continuously and to increasing numbers since. The total number to 1929 is 202, of whom about 135 now hold teaching or administrative positions in colleges or universities. Ten have entered the ministry, the remainder having as a rule engaged in literary, scientific, or social work.

The subjects chosen for theses for the doctor's degree may be classified as follows:

	1878–1905	1906–15	1916–28	Total
Metaphysics and Epistemology	15	14	24	53
Ethics and Theory of Value	8	9	9	26
Logic and Methodology	0	2	6	8
Religion	4	5	6	15
History of Philosophy	26	20	29	75
Total	53	50	74	177

A study of this table indicates that systematic subjects have shown a pronounced popularity during the last twelve years, indicating that the recent increased emphasis on historical study has not yet had time to show itself in completed dissertations. Considering the separate branches of systematic philosophy, there has been some decline in the relative number of theses in ethics and religion, probably connected with the fact that there has been a notable diminution of the number of students who combine philosophy with theology, or approach the subject from the standpoint of the ministry. There has been a correspondingly greater choice of the more technical subjects in metaphysics and epistemology, and an unmistakable drift in the direction of logic.

(d) *Facilities and Resources.* Under the skilful and assiduous direction of Dr. Benjamin Rand, Librarian of the Robbins Library of Philosophy and Psychology in Emerson Hall,[1] and with the coöperation of members of the Department in their several fields, the collection of books on philosophy and psychology has steadily grown. The volumes in the Robbins Library are ordinarily duplicates of the greater collection on philosophy and psychology in the College Library, which increased from about 10,000 volumes in 1906, to nearly 30,000 in 1927.[2]

Special gifts of books, or of money for their purchase, have enriched the materials for the study of philosophy. Royce presented his valuable Schelling collection in 1905, and annotated volumes from his personal library were purchased after his death in 1917. In the latter year some 3500 books and pamphlets from Münsterberg's library were presented by a group of his friends, and to these were added 4000 more from the same source in 1927. Palmer gave his unique collection of early editions of philosophical classics in 1919. In 1923 the James family presented over 1500 books and pamphlets from the library of William James. To these volumes, many of which are annotated, have since been added a rich treasure of James letters and other manuscript material, much of which is as yet unpublished. The extensive unpublished literary remains of Charles S. S. Peirce (A.B. 1859) which came into the possession of the College Library in 1915, are now being edited and prepared for the press by the Department. The interest of Professor De Wulf and the coöperation of the Assistant Librarian of the Vatican has stimulated the growth of the collection of books on mediaeval philosophy, until it is now comparable in completeness with those of the Vatican and the Bibliothèque Nationale.

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[1] Founded in 1905 by Reginald C. Robbins (A.B. 1892), with about 2300 volumes, the later growth of the Library to 8100 in 1928 was further aided by funds provided by Nelson Robinson, Jr. In addition to these and other benefactions (such as the Walker, Treat, and Jackson Funds) which have added to the library resources in philosophy and psychology, special aid has been made available for students of these subjects by the establishment of the James Walker, Philip H. Sears, Robert Treat Paine, and Henry Bromfield Rogers Memorial Fellowships, and similar foundations.

[2] Excluding the volumes catalogued under church history, literature, and other related subjects.

Among the invigorating contributions made by the Department of Philosophy to the University, Emerson Hall must be named. It was the first building in America devoted exclusively to philosophy; long planned by a department previously scattered over the college grounds wherever a casual lodgment could be found. Its many facilities for work have drawn to Cambridge a superior class of graduate students from every part of the country. The cost was large, building and equipment $208,485; but each member of our staff obtained subscriptions for it among his friends, and a large committee with Richard H. Dana (A.B. 1874) at its head powerfully aided us. Desiring to commemorate through it one of the most pervasive of the earlier philosophic influences — and that too a Harvard graduate — we called it Emerson Hall and dedicated it on the hundredth anniversary of Emerson's birth, May 25, 1905, with a meeting of the American Philosophical Association of the entire country. Every day, therefore, when our students assemble they stand under the guardianship of the man most eminent in philosophy and literature that America has produced. This twofold influence is striking in James, Royce, Santayana, and Münsterberg. They received a rich inheritance. Long may it be distributed throughout Harvard, and beyond.

II. THE CLASSICS

1867–1929

By Herbert Weir Smyth, Ph.D.
Eliot Professor of Greek Literature, Emeritus

1. The Classics and the Elective System

FOR over four hundred years the language and the literature of ancient Greece and Rome have been used as instruments to train the faculties of man that their exercise might be realized in purposeful action. As few other disciplines they have invited discussion both of the aims of all intellectual education and of the methods requisite to secure the best education of the mind. They have played a part in a modified form of the old-time quarrel of the Ancients and Moderns; in the contest between humane and utilitarian studies; in the evaluation of prescription, as contrasted with unrestricted liberty, in educational systems; and they have been drawn into the controversies of paedological psychology respecting the very existence of mental discipline.

With the vexed problems of educational theory and machinery I am not here concerned. My primary function is that of the historian of instruction in the Classics at Harvard from 1867 to 1929. Instruction in Greek and Latin is intimately connected with the evolution of Harvard during that period, a period distinguished in educational theory by the second development of the elective system to its acme in 1884, and its subsequent modification in 1910–11.

By age and tradition Harvard has long been a nurse of classical studies. For two centuries after its foundation, Harvard seems to have preserved much of the educational system inherited from the home of its founder. Together with Hebrew and mathematics, the Classics occupied a privileged position. Reigning without rivals, these three formed the obligatory 'literature, arts, and sciences' by which the youth of early New England was to be qualified 'for public employment both in Church and State.' So long as the grammatical study of Greek and Latin continued to form the basis of liberal education, the intellectual ability of youth was measured solely in terms of aptitude for the study of those languages; preferment and superior social position were appanages of classical culture. 'A gentleman and a scholar' had noble instincts and could read his Homer and Virgil. For the evils of this illiberal and circumscribed system of studies, the Classics, though they formed only a part of that system, were made chiefly responsible by reason of their dominant position, and because they were ill taught.

In the first quarter of the nineteenth century the exclusive preponderance of the Classics was relaxed in favor of the modern languages and the natural sciences. In 1856–57 the Classics, compulsory for Freshmen, Sophomores, and again for Juniors, demanded two fifths of every student's time.[1]

Even in the middle of the century the undergraduate suffered oppression. Charles Francis Adams (A.B. 1856) in his Phi Beta Kappa address of 1883, 'A College Fetich,' lived himself backward to feel afresh the galling fetters of an ancient wrong. Aspiring youth, denied the right to develop its native talent, was stifled in spirit through coercion of its will. The mediocre student, to whose capacities the instruction was accommodated, was offered no opportunity to escape the bars of his mediocrity. In vain was the dunce Hellenized, in vain the drone Latinized by men who taught imperfectly and unlovingly — schoolmasters, for all their prouder title in the college catalogue. Oblivious of the fact that the Classics had long become optional even for Sophomores, Mr. Adams protested against the insistence on Greek and Latin by the College, and advocated the abrogation of the existing requirement of Greek for admission. But even Jeremiah's lamentations end by comfort to Jacob with the restoration of Israel. A quarter-century passed. Mr. Adams would now prescribe 'one of the classic tongues, Greek or Latin, as a compulsory study to the day of graduation, the one royal road to all that is finest in letters and in art.' 'A College Fetich' has been long remembered; the recantation soon forgotten.[2]

In 1867–68, the close of the administration of President Hill, studies other than elementary were first offered as options, and electives first established for Sophomores. All courses in the Classics were made voluntary after the Freshman year, and voluntary they have remained.

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[1] The relaxation was not gradual; there was both action and reaction from 1841 to 1865–67, a period when Latin was required and Greek elective for Juniors. For details, see President Eliot's *Report* for 1883–84, pp. 6–30.

[2] C. F. Adams, *Three Phi Beta Kappa Orations*, p. 133.

The earliest reformers had dreamed only of release from excessive prescription. Little did they foresee the changes of another sort, momentous alike for the teacher and the taught — enlargement of every department of the University, advanced standards of scholarship, revolution in the meaning of a 'liberal education' — effected by the system of 'free electives' under President Eliot. In 1884–85 Greek and Latin were remitted from the prescription of Freshman studies. Now, with an inclusive tolerance, every course in any subject, general or technical, weighed equally in the official scale. The doctrine of democratic equality had invaded the domain of education.

From that time the study of the Classics at Harvard has been entirely voluntary. Whether their demotion was for gain or loss, any invidious distinction created by their artificial protection was at least removed.

The legislation of 1884 was opposed by most of the instructors in the Classics, unwilling to expose the incoming student to disciplinary loss at a time when he was least capable of steering his own course. They had supported in vain the amendment that every Freshman must take one elective in Greek or Latin. The older members of the Department had witnessed a rise in the general standard of scholarship after 1868; they believed that the regulation of that year had amplified and improved the instruction. But they held that, with Greek and Latin required for Freshmen, sufficient regard was already paid to the inclinations of the individual student by the options of his later college course. The Department likewise had little sympathy with a plan of admission to college that enabled the candidate for the degree of A.B. to enter college without Greek and Latin, and (as Professor Goodwin said) to graduate with the highest honors without ever having read a line of the Iliad.

But the representatives of the Classics could count some gains. If the hopes excited in England by the Electoral Reform Bill of 1832 included (as Sydney Smith suggested) the abolition of gerunds and supines, the Harvard teacher of the Classics, after the educational reform of 1884, was no longer to hold *in terrorem* before unwilling pupils these and like impediments to the joy of youth. No longer was the Freshman to be confined to the strait-jacket of studies reluctantly pursued, that treated (or seemed to treat) classical literature as a treasure-house of rules for settling ὅτι's business, or for imparting finesse in the use of the aorist. Certainly the Harvard Hellenist who knew more about the aorist tense than any other scholar of his time, believed that the aorist was made for man, not man for the aorist.

Time was to test the value of the undisturbed freedom proclaimed in 1884. Within two decades it became manifest that the undergraduate had been given too loose a rein. The very effort to secure breadth of sympathy, even at the risk of fugitive preference, tended to induce intellectual lukewarmness. For some the college vineyard grew grapes of too many kinds; others drank too deep of one vintage.

With the new administration of President Lowell the College adopted 'concentration and distribution,'[1] restricting capricious choice, and that premature and often illiterate specialization which tempts youth to know increasingly more about increasingly less. This system worked less change for the student of the Classics than for those of some other disciplines. Even with unrestricted liberty of choice he had rarely been an exclusive specialist or an intellectual nomad.

The flexibility of the new system allowed him to include other subjects in his main group. Of the six courses necessary for concentration, at least four must in be the Classics; for the remaining two he might choose a modern language and literature, or the Fine Arts.

Before 1887 both Elementary Greek and Elementary Latin were required for admission to Harvard College. In 1887 only one of the two was required, although Greek and Latin carried greater weight than other studies; but the Freshman was obliged to take either French or German if he had not presented it for admission. Under the 'New Plan' of 1910, every candidate for the A.B. degree has to offer Elementary Greek or Elementary Latin for admission; but even if he continues the study of the Classics in college, he is required to prove, before being promoted to the Junior class, that he has a 'reading knowledge' of two of the three languages Latin, French, and German, or a 'reading knowledge' of French or German and an 'elementary knowledge' of the other of the two languages. Failure to meet these requirements is penalized by 'probation.' Hence the average Freshman who has not taken Greek for entrance,[2] and who must also satisfy his 'language requirements,' is apt to think a second ancient language too much, or, postponing such election, to become absorbed in some other subject.

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[1] See Introductory chapter on College Studies.

[2] The abolition of Freshman Greek has gradually driven instruction in the language from most secondary schools.

2. The Staff [1]

Among the past worthies in the Classics some have acquired a legendary, perhaps even a mythical, character, because of their idiosyncrasies. In the College Yard only eccentricity creates mythology. 'Old Pop' and 'Piggy' Everett were eccentric; 'Old Sophy' was both picturesque and eccentric.

If you looked at the massive head of Sophocles, he seemed to resemble Zeus of the ambrosial locks, whose eyes flashed fierce fire, as if he had been the Cloud-compeller wrangling with his heavenly consort — ungodlike were his nether parts. To the undergraduate a living Greek was an awe-inspiring being. This self-exiled Greek lived in his ascetic cell in Holworthy as if he were a monk on Mt. Sinai or in Cairo. Rugged he was, repellent, paradoxical; bitter of speech, but kind of heart; full of humor, and of whimsical logic. Many are the tales of his capricious disregard of academic regulations. To a proctor, reporting that a student had cheated at examination, he made answer, 'It make no matter. I nevare look at his book anyway.' —

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[1] Until 1814, when the Eliot Professorship of Greek Literature was established, instruction in both classical languages had been given by tutors. Among the most broad-minded teachers of Harvard are two former tutors in Greek: George Herbert Palmer and LeBaron Russell Briggs. In 1825, the teachers of the Classics numbered four, in 1867 seven, in 1928 seventeen. Several European scholars have given regular instruction for at least one term: W. M. Lindsay (Oxford), E. von Dobschütz (Halle), R. S. Conway (Manchester), E. E. Sikes (Cambridge). In the early period Germany was the Mecca of our classical scholarship, and the resort thither made an era in American education. Before 1890, most of our professors of the Classics had studied, if not obtained their doctor's degree, abroad. Lane (A.B. 1846) was a graduate of Göttingen (1851), at which university three of six Eliot Professors have proceeded to the doctorate: Edward Everett (A.B. 1811, PH.D. 1817, the first American to receive the degree), Goodwin (A.B. 1851, PH.D. 1855), and the present writer (A.B. 1878, PH.D. 1884). Smith (A.B. 1863) studied there in 1865. Allen was a PH.D. of Leipzig (1870); Warren, of Strasburg (1879). William Everett (A.B. 1859, PH.D. 1875) and Anderson (A.B. 1865) received a second bachelor's degree from Cambridge; Parker and Dyer (A.B. 1874), from Oxford, which has attracted several members of the recent or present staff. France has given us a Docteur-ès-lettres and a Licencié-ès-lettres. Of members of the regular teaching force who have not been Harvard undergraduates, Great Britain has contributed four. Of the eleven professors who have died since 1868, Goodwin was in active service for forty-five years, Lane for forty-three, Sophocles for forty, Greenough for thirty-six, White and Howard for thirty-five, Smith for thirty-four, and Parker for thirty-three.

'Where did Homer see lions?' posed the rest of the class. 'At Barnum's circus,' said Milton, and that unworthy got then for the first time, and thereafter continued to get, the highest mark.[1] — X and Y were among the candidates for admission examined in a group, and *viva voce*, as was the custom then. The next day X asked his grade. 'Passed,' said Old Sophy. 'And Y?' said X, though certain that his friend had failed. 'Passed,' was the reply: 'It is unfair to discriminate. You all do know nothing.'

Sophocles was born about 1800 in a hamlet at the foot of Mt. Olympus. His birth-name was Evangelinus Apostolides; but to the patronymic he added the name of the dramatist because he had thus been dubbed by his favorite teacher. He was Tutor from 1842 to 1859, University Professor of Ancient, Byzantine, and Modern Greek from 1860 to 1883; in which last capacity he taught Polybius, Plutarch, Arrian, Justin, Hippolytus, Ecclesiastical Greek and the Christian Fathers, and the Early Christian Sects. Of the authors of the classical period read by graduates he taught only Pindar. He wrote a Greek Grammar, but his fame as a scholar rests on his Greek Lexicon of the Roman and Byzantine Periods, a memorial edition of which monumental work was authorized by the President and Fellows in 1887.

George Martin Lane (1823–97, A.B. 1846), on his return from Germany in 1851, was appointed University Professor of Latin without having passed through any period of probation as a teacher — an unusual kind of appointment but, as President Eliot said, never better justified. On the foundation of the Pope Professorship in 1869 he was transferred to that chair, which he held until 1894.

> As a teacher [wrote Professor Morgan, one of his most gifted pupils], Professor Lane had all that fine literary appreciation which characterizes the English school, combined, however, with the minute and exact knowledge of the Germans. Besides his never-failing good nature, he had two gifts which, perhaps more than any others, awoke the admiration of his undergraduate pupils — his prodigious memory and his great originality of thought. He seemed familiar with every literature; and apposite quotations from the most varied sources, now

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[1] And, one may add, bequeathed to his college the Milton Fund for research, from the professorial view certainly the most important benefaction in recent years. See memoirs of Sophocles by G. H. Palmer in *Atlantic Monthly*, lxvii (1891), 779–788; C. L. Jackson in *Harvard Alumni Bulletin*, xxv (1923), 716–725.

EVANGELINUS APOSTOLIDES SOPHOCLES

WILLIAM WATSON GOODWIN

> drawn, may be, from the New England Primer, and now from the greatest of the Classics, were made to illuminate the passage under discussion. The atmosphere of his class-room was thus distinctly literary. . . . It was seasoned, too, with his own peculiar wit. . . . He seldom wasted time in putting questions which could be answered offhand; he never hesitated to suggest problems which nobody present, not even himself, could solve. He made it clear that there were wide untrodden fields on every side and tempted his pupils on to exploration.[1]

Lane was a teacher rather than a writer of books. His Latin Pronunciation (1871) exterminated in this country the English pronunciation of the language. His Latin Grammar was to have been his lifework, but was left unfinished because of his passion for thoroughness. This work, completed as a labor of love by Professor Morgan, is one that, in the words of Professor Gildersleeve, will 'abide not only as a repertory of important facts and a repository of acute observations but as a monument of literary art and sympathetic interpretation.'

William Watson Goodwin (1831–1912, A.B. 1851),[2] returning to Harvard with a Göttingen Ph.D., immediately became a tutor in the College. In 1860, when Felton resigned the Eliot Professorship of Greek Literature to become President, Goodwin succeeded him. The intellectual spirit of scientific research in the field of grammar, for which he was best known in the wider circles of American scholarship, did not blunt his literary and artistic sense. But he did not allow the language of emotional appreciation to trouble the tranquil harmony of imagination and reason that gives to Greek literature its undying charm. Like the reticence of that literature, the reticence of its expositor marked his power. He appealed therefore less to the many than to the few, who needed no spur in their 'chase after beauty.' He was, as President Eliot said, 'an exact scholar himself, and had no respect for inaccurate, vague, parasitic discourse on or about great authors. He wished every man who called himself a scholar, whether young or old, to be accurate, clear, and thorough; then he might be as ingenious, brilliant, romantic, and poetic as his nature permitted.' He laid no special emphasis on formal grammar; but he believed that without grammar there can be no true appreciation of literature. In textual criticism he abhorred supersubtle ingenuity, confessing himself unable to understand passages corrupt beyond all cure.

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[1] *Harvard Studies in Classical Philology*, vol. ix; memoir by Goodwin in *Publications of Colonial Society of Massachusetts*, vi, 97–105.

[2] Memoir by C. W. Eliot in *Proceedings of Massachusetts Historical Society*, October, 1912; memoir by H. W. Smyth in *Harvard Graduates' Magazine*, xxi, 22–30; *Proceedings of American Philosophical Society*, January–April, 1913; *Proceedings of American Academy of Arts and Sciences*, September, 1918.

To the investigation of the history, antiquities, and law of ancient Greece, Goodwin brought a mind keenly observant of the similarities and differences between ancient and modern times. His mastery of these fields appeared in his course on Thucydides and in his editions of Demosthenes' On the Crown and Against Midias. To Pindar and Sophocles he devoted some attention, much to Aeschylus. Though not of a distinctly philosophical mind he was a judicious interpreter of Plato's Republic and Aristotle's Ethics. His famous book, Syntax of the Moods and Tenses of the Greek Verb, is a work of independent research, distinguished for its range and accuracy of observation, for its lucidity and exactness of statement, and for its refusal to be involved in metaphysical subtleties and to trust to the equivocal oracles of the comparative grammar of his time. His Greek Grammar, which first appeared in 1870, is widely used in this country, and, like the work on syntax, has a deserved reputation in England.[1]

Goodwin kept unimpaired the serenity of the scholar whose only aim is the truth and who sinks his personality in his work. Like the 'high-minded' man of Aristotle, praise did not elate nor blame deject. His every spoken and written word was as clear and simple and straightforward as his life. Reserve warded off the aggression of emotion in others, as it was his defence against its promptings in himself. But no one could pass the barrier of his aloofness without loving him for the warmth of his heart, his sympathy, and his never-failing kindness.

James Bradstreet Greenough (1833–1901, A.B. 1856) taught Latin from 1865 till his death. The breadth of his intellectual sympathies was early indicated. While still a tutor, his attention was attracted to Comparative Philology, a subject that both then and later influenced his work in Latin. Eight years before the establishment of a professorship in Sanskrit, he first gave instruction in that (self-taught) language. With his appointment as Professor of Latin, his energies as a teacher were directed to that field. Of the authors taught by him after 1872, Cicero occupied an important place, and was studied in various aspects, both critically and in relation to his exposition of Greek philosophy. Of the poets, he taught Terence, Virgil, and Horace. Caesar's Gallic War from the topographical and archaeological point of view was one of his latest subjects of study. His course on the Private Life of the Romans was introduced in 1881. The distinctive methods of the Classical Seminary were anticipated by his Exercises in Classical Philology and critical study of Latin authors from the original sources. His earliest publication, The Analysis of the Latin Subjunctive (1870), anticipated the method and many of the results in certain essential doctrines of the more famous treatise by Delbrück.[1] Allen and Greenough's Latin Grammar, first issued in 1872, has had a regulative influence on the study of Latin syntax in America because of the orderly presentation of the facts and its explanation of the reason and origin of constructions.

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[1] He corrected the translation of Plutarch's *Morals* first issued in 1684–94; revised Felton's editions of Isocrates' *Panegyricus*, Aristophanes' *Birds* and *Clouds;* prepared a *Greek Reader*, and, with his colleagues White and Morgan, an edition of the *Anabasis*.

The chief results of Greenough's researches and discoveries were usually compressed into editions of Cicero, Caesar, Livy, Virgil, Horace, and Ovid, which gave evidence of his power to communicate his ideas in a form suited to the needs of younger students. His more special studies in Latin etymology, morphology, syntax, versification, Greek religion, and so forth, are contained in the Harvard Studies in Classical Philology, a publication established, through his influence, by members of his college class. He exerted influence on the teaching of the Classics by his introduction of 'reading at sight,' first applied in 1871 in the Latin grammar paper for admission to Harvard, and thereafter adopted far and wide in written tests. His mastery of Latin style was displayed in his addresses and letters to his colleagues, and in his verse.[2] No one could come to know Greenough without feeling invigorated by his intense and sympathetic personality. G. L. Kittredge, his colleague and associate in the revision of some of his books, has written of him:

> Intellectually he had that indefinable touch which we call genius. His mind was at once discursive and logical. He jumped from point to point, from subject to subject, with an agility that often left the hearer

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[1] *Der Gebrauch des Conjunctivs und Optativs im Sanskrit und Griechischen.*

[2] See the chapter on Music for his Harvard Commencement Hymn.

breathless in the attempt to follow him. Yet he could always supply — to order — the logical stages through which his thought had passed. His discursiveness (of which he was quite aware) was in fact one of his strongest points, for it was controlled by a combination of logical keenness and historical imagination which are seldom found united. The rapidity of his mental processes was prodigious, — but not more remarkable than the slow, minute patience with which he analyzed an idea or a construction. His intellectual curiosity was insatiable, and he communicated some part of his enthusiasm to all who came under his influence.[1]

Clement Lawrence Smith (1844–1909, A.B. 1863) taught Latin from 1870 to 1904, the last three years as the second Pope professor. The high quality of his instruction was appreciated by advanced students who followed his systematic study of the History of Latin Literature, first given at Harvard by him (1885), and his courses on Catullus and the Elegiac Poets, the Georgics, Cicero's Correspondence, Tacitus, and Juvenal. Roman Antiquities (1893) and Latin Epigraphy (1898) first became subjects of formal instruction under his direction. Together with Greenough and Allen he introduced mature students to practice in text-criticism and interpretation. A fine literary feeling marked his presentation of the materials gathered for his lectures with accuracy, art, and skill. Yet he believed that he could better serve Harvard as an administrator than as a productive scholar. Though Dean for thirteen years, he found time to edit Horace's Odes and Epodes and to write papers on educational and other subjects.[2]

Grave, reticent, and of an unassuming dignity, Smith impressed all by his finely balanced judgment, his reserve force, and a courtesy that marked the expression of his opinions however at variance with those of others.

Frederic De Forest Allen (1844–97, A.B. Oberlin 1863) was Tutor in Greek in 1873–74; after service as professor at Cincinnati and Yale he was recalled to Harvard in 1880, when special prominence was being given to the enlargment of our Graduate School. No other scholar was better qualified than he to assist its development by a broad-minded scholarship based on a comprehensive and detailed knowledge of both Greek and Latin language and literature and the ability to train advanced students in the methods of scientific investigation. To the success of the Graduate School Allen probably contributed more than any other of its earlier teachers. By the terms of his appointment his instruction was intended for graduate and other advanced students; though at times he taught undergraduates because of desire 'to keep in touch with young and unformed minds.' The first Professor of Classical Philology at Harvard, he realized the varied obligations imposed by such an office. His scope of instruction was extraordinarily wide. He lectured on Greek Grammar, Greek Dialects and Inscriptions, the History of Greek Literature, the Critical Study of Homer; on Roman Drama, especially Plautus, Virgil's Bucolics and Georgics, the Critical Study of Ovid, Ovid's Fasti; on Greek Religion and Worship, Roman Religion and Worship; on the Elements of Oscan and Umbrian. He conducted a course on Practice in Speaking Latin, on the History, Scope, and Method of Classical Philology, and on Text-criticism and Interpretation. He was one of the virtual founders of the Classical Seminary.[1] Himself a musician, and composer of the music for the performance of *Phormio*, his understanding of ancient Greek music was probably superior to that of any other American scholar. — Greenough wrote: 'He had no interest in the Classics as a mere accomplishment . . . for him classical learning was a real science, a great branch of anthropology, giving insight, when rightly studied, into the mental operations and intellectual and moral growth of ancient peoples. To him literature and monuments were records of life, and they were to be interpreted by it, and in turn were themselves to interpret it.'[2] Schooled by strict philological discipline and secure in his command of philological methods, Allen was a student in the deepest sense of the word, preëminently an investigator, enthusiastic to discover truth, even in the littlest things. No blind adherent of philological orthodoxy, he sought untiringly to find the ultimate facts if ascertainable. This quality won the confidence of his students and colleagues; as it was also a spur to like intellectual honesty. An authority in many fields, he dogmatized in none.

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[1] *Harv. Stud. Class. Philol.*, vol. xiv (1903); cf. *Harv. Grad. Mag.*, x, 196–201.

[2] On 'Virgil's Instructions for Ploughing, Fallowing, and the Rotation of Crops' (*Georgics*, i, 43–83); 'Catullus and the *Phaselus* of his Fourth Poem "; 'Cicero's Journey into Exile'; and 'A Preliminary Study of Certain Manuscripts of Suetonius' Lives of the Caesars.'

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[1] His publications comprise an edition of the *Medea*, Remnants of Early Latin, a revision of Hadley's *Greek Grammar*, a translation of Wecklein's edition of the *Prometheus*, and more than thirty tracts on many subjects: Greek and Latin grammar, etymology, versification, inscriptions, literature. Among these special mention should be made of his *Ursprung des homerischen Versmasses* and *Greek Versification in Inscriptions*. His collation of the Scholia to Plato in the *Clarkianus* and *Parisinus A* was left unfinished at his death, and is now deposited in the College Library.

[2] *Harv. Stud. Class. Philol.*, ix, 31.

John Williams White (1849–1917, A.B. Ohio Wesleyan 1868) owed his appointment as Tutor to his edition of the *Œdipus Tyrannus* published in 1873, after his return from study in Germany. In 1877 he took his doctor's degree and became Assistant Professor; from 1884 to 1909 he was Professor of Greek. Equally efficient as an inspiring teacher of undergraduates and graduates and as an executive officer, he was no less distinguished as a scholar. To his original and progressive ideas Harvard is indebted for many innovations in the method and scope of instruction in the Classics. Realizing the wisdom underlying Voltaire's advice that Homer should be read in large masses, he urged the importance of wide reading to be gained by 'reading at sight,' and by other means promoted 'facility in reading.' Under his guidance students read 150 hexameters a lesson instead of 40 under the older method; and acquired an equal ease in dealing with the dramatic poets, Herodotus and Xenophon. His course on Aristophanes (1889) began the now common practice of reading the entire works of an author in a single year. He used the remains of Greek art to illustrate Greek literature. In his lectures on the Life of the Athenians from the Monuments (1881) and on the Private Life of the Greeks (1890) he made systematic use of lantern-slides for the first time in regular collegiate instruction — an adaptation of Greek archaeology that in time has enabled Harvard students to visualize from the painted vases the life of a people passed among man's noblest and fairest creations in architecture and sculpture. No less characteristic of White's purpose to diffuse an appreciation of the achievements of Greek genius was his course on the History of the Greek Drama (1898), primarily intended for students not specializing in the Classics. He was the earnest supporter, probably the originator, of the plan to produce in America a Greek play in the language of the original; and the successful performance of the *Œdipus Tyrannus*, which, in the words of Professor Jebb, the editor of Sophocles, was distinguished by 'thorough scholarship, archaeological knowledge, and artistic skill,' led to the production of the *Phormio* and *Agamemnon*.

A 'living dynamo' — in the phrase of Dr. Holmes — White projected himself with energy and enthusiasm not only to improve instruction but also to advance knowledge. He early displayed interest in the metrical and rhythmical structure of Greek and Latin verse. In 1878 appeared his translation of Schmidt's *Leitfaden in der Rhythmik und Metrik der classischen Sprachen* — 'a pedestrian performance,' he later called it. At threescore he resigned in order to set himself exclusively to the work which he had planned as the consummation of his activity as a scholar: an exhaustive edition of Aristophanes based on an independent collation of all the manuscripts inclusive of the ancient commentators. 'With a great thing to pursue,' he died ere he knew it, unable to complete even the first of ten projected volumes. The Verse of Greek Comedy (1912) and the Scholia on the *Aves* (1914), the first fruits of his research, at once placed him in the front rank of Aristophanic scholars. Though their author's larger hopes failed of fruition, his goal was the test of quality; his ideal remains unconquered, an inspiration to the scholar who is content with nothing less than the completeness of the perfection of knowing all. Athens held in the same honor her sons who fell and her sons who survived at Marathon.

Minton Warren (1850–1907, A.B. Tufts 1870) came to us in 1899 with twenty years of experience in directing the Latin studies of advanced students at Johns Hopkins University. Professor of Latin until 1905, and for the remaining years of his life Pope Professor of Latin, he was distinguished for his lofty conception of the teacher's profession, for his devotion to the intellectual progress of his students, and for his passion to discover truth through research.

His courses of instruction dealt with Horace, Cicero's Correspondence, the comedies of Plautus and Terence, and with the interpretation of Latin inscriptions. If his published writings are neither numerous nor extensive, they excel in quality.[1]

Warren stood in the front rank of Latinists, recognized as an authority in early Latin, Terence, palaeography, and epigraphy. Foregoing the fame that publications of his own would have won, he directed his energies to the training of future teachers and investigators — the numerous band of 'Warren's men,' proud of their title, and inspired by their master's passion for creative work, by his independence, his open-mindedness, and his strictness of discipline.

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[1] Apart from his many notices and reviews of philological publications, his chief works were an edition (the first) of the famous *St. Gall Glossary* (1884), collations for an (unfinished) edition of Terence, 'Unpublished Scholia from the *Vaticanus C*,' 'On Five New Manuscripts of the Commentary of Donatus,' and epigraphical studies, in particular that dwelling with the Stele Inscription in the Roman Forum.

An adequate appreciation of his work may not deprive itself of the words of Professor Laing of the University of Chicago, one of his pupils at the Johns Hopkins.

> He was a student in the highest sense of the term, reading everything and remembering everything; keen to see the strong points of an argument and equally quick in his perception of its weakness; weighing, testing, sifting, bringing to bear on the subject under consideration his unrivaled erudition and nicely balanced judgment. A firm believer in minute and detailed investigation, he was yet saved from the narrowness of which so many of our scholars are accused by the facility and freshness of interest with which he could turn from one subject to another; and whatever the subject, he used the same method, going to the very bottom of the question.[1]

John Henry Wright (1852–1908, A.B. Dartmouth 1873) was already a distinguished classical scholar and student of educational problems when, in 1887, he was called to Harvard from Johns Hopkins as Professor of Greek. With us he had ampler opportunity to press toward his ultimate goal: the vision of the many-splendored whole of classical antiquity in its simple and severe outlines, its forms, its ideas, its ideals. The corporate endeavor of Harvard 'to image the whole, then execute the parts' was realized in him by reason of his extraordinary versatility.

He conducted courses in Plato and Aristotle, Sophocles, Classical Archaeology, Ancient Greek Painting, Pausanias, Greek Epigraphy and Palaeography, Institutions and Biographies, Greek History, both political and constitutional.[2]

His multiform activity as teacher and investigator neither impaired his efficiency as Dean of the Graduate School[3] nor diminished his willingness to accept varied opportunities to advance knowledge and foster scholarship. His life was 'rich in its ideal of a rational scholarship that held in just equilibrium minute but profitable research and imaginative sympathy with the highest achievements of the people whose literature, art, and history he felt himself privileged to interpret; but richer in its unswerving loyalty to the dignity of man.' [1]

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[1] *Harv. Grad. Mag.*, xvi, 502.

[2] Among his publications are articles on 'The Origin of Plato's Cave,' 'Aristotle's Constitution of Athens,' 'Unpublished White Lekythoi from Athens,' 'The Origin of *Sigma Lunatum*,' 'Studies in Sophocles,' and a translation of Collignon's *Archéologie Grecque*.

[3] See Professor Haskins's chapter on the Graduate Schools of Arts and Sciences.

Charles Pomeroy Parker (1852–1916) [2] was the first Harvard teacher of the Classics who received the bachelor's degree at Oxford, where he won a First in *Literae Humaniores* in 1876. With scholarly sympathies and broad learning equally distributed between Greek literature and Latin literature, he was peculiarly qualified to exemplify the Harvard conviction that those literatures must be studied together for the understanding of the essential unity of ancient thought. From 1883 to 1916 Parker gave instruction, at different times, in nearly every one of the undergraduate courses in Greek and Latin. The problem how both languages should be taught was treated in his lectures on the Methods and Equipment of a Teacher of Classics in Secondary Schools. Transferring, wherever it was practical, the Oxford system of tutorial consultation with individual students, he acquired a personal influence of rare distinction. He inaugurated the 'tutorial system' long before it was officially established. A further advantage to Harvard was the interest in ancient philosophy that he brought from Oxford. Before his time, instruction in that subject had been largely confined to lectures designed to illustrate Plato and Aristotle, and the interpretation of Greek philosophy by the Romans. While still a tutor, Parker began (in 1886) that systematic instruction which in time traversed the earliest to the latest period. His occupation with Heraclitus was shown by an essay on The Philosopher of Harmony and Fire and by the course on the Philosophy of Motion (Heraclitus, Protagoras, Democritus). Essentially Platonic in his temperament, he gave many courses on Plato for undergraduates and graduates.[3]

Parker followed the influence of Greek thought upon the Roman world in his lectures on Cicero's Interpretation of Greek Philosophy. But his deeper interest in the later field lay in Stoicism as it drew nearer to a religious conviction in the wisdom of Providence and the moral governance of the world. He studied Seneca from every angle in a series of courses from 1893 to 1912. That the tale of his publications[1] is all too brief, that he did not achieve his purpose to write a book on Stoicism or to edit the Scholia on Plato, a project begun by Allen, has its ultimate explanation in the moral constitution of the man. To him teaching was a sacred calling. To his reverence for its aim to form the lives of men he contributed something akin to the spirit that had led him to take Holy Orders. It was but second nature with him not to refuse the call that summoned him to undertake the duties devolving upon a member of the Administrative Board, the Chairman of Freshman Advisers, and the Secretary of the Committee on the Choice of Electives. He gave counsel to a host of students, whose plans he helped to form as he grew to know them, understanding all with their separate purposes in College and their aspirations in life. Parker was an apostle of Humanity and a veritable saint on earth.

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[1] Memoir by H. W. Smyth in *Harv. Grad. Mag.*, xvii, 439.

[2] Memoir by E. K. Rand in *Harv. Grad. Mag.*, xxv, 298–305.

[3] His paper on 'Plato and Pragmatism' in the *Harvard Essays on Classical Subjects* is marked by subtle reasoning and delicate charm. To the *Harvard Studies in Classical Philology* he contributed an article on 'The Historical Socrates in the Light of Professor Burnet's Hypothesis.'

Something of the spirit of Lane was transmitted to Morris Hicky Morgan (1859–1910, A.B. 1881, PH.D. 1887), who after twelve years' teaching succeeded Allen as Professor of Classical Philology.[2] A treble-headed power, he was at once an inspiring teacher, a productive scholar, an effective administrator. Prompt in his decisions, he maintained them with fearless energy. Exacting much of himself, he exacted much of his pupils. His younger students stood somewhat in awe of him. His more advanced pupils welcomed a severity that stimulated but did not dishearten. His finished literary taste in English and in Latin imparted a distinction to his appreciation of the Classics. With his interest in ancient life and thought was partnered a keen interest in the modern world. Among the subjects of instruction offered by him for advanced students were Greek Poets between Homer and Aeschylus, Early Greek Oratory, Isaeus and the Greek Law of Inheritance, the Philippics of Demosthenes and Cicero, Roman Satire from Ennius to Juvenal, Virgil, the Early Career of Cicero, Roman Literary Criticism, Literary Criticism in Antiquity, Text-Criticism and Interpretation of Classical Authors. The work with which his fame as a scholar will be longest remembered is a translation of Vitruvius, almost finished at his death and completed by Professor Howard.[1]

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[1] His publications on Stoicism include a paper on '*Sacer intra nos Spiritus*' (Seneca, *Epist.* 41), 'Musonius the Etruscan,' and 'Musonius in Clement.'

[2] Notice by Gildersleeve in *American Journal of Philology*, vol. xxxi (June, 1910).

Morgan was a man of radiant high spirits, strong feeling, and well-defined opinions. What he thought, that he spoke out. The criticisms he visited upon others, he welcomed for himself, if offered with his own frankness and loyalty. Under his manner, aggressive or brusque at times, dwelt warm human affection.

Albert Andrew Howard (1858–1925, A.B. 1882, PH.D. 1885) succeeded Warren as Pope Professor of Latin in 1908, after eighteen years' service. Harvard has had no more devoted son than he; and she has had few abler teachers. He seemed unhappy far from the College Yard. Vacations spent elsewhere, assemblages of fellow scholars in other places, had slight charm for him; and even Sabbatical leave of absence he would not take — it had been a kind of treason to the College. His business, as his pleasure, was to teach, to give his best to his pupils. He knew the Roman world and made it live in the imagination of his students; and he was an adept in correlating ancient with modern life, ancient with modern literature. He would not lose contact with reality. He stressed facts rather than aesthetical theories. Above all he insisted on his pupils' knowing ancient literature at first hand. In time he gave instruction in all the regular Latin courses for undergraduates. His graduate courses were the Second Punic War from Livy, the Reigns of Claudius and Nero (Suetonius and Tacitus), Terence, Seneca, and Latin Palaeography. Interested in Roman public antiquities, he prepared a text-book of Latin Selections illustrating Public Life in the Roman Commonwealth in the days of Cicero. He published little. He had contempt for the contributions of men who rushed prematurely into print, as for all shows, pretentiousness, and sentimentalism. He would wait until he could do a thing so well that it needed no doing over again. With this ambition he made elaborate preparation for a definitive edition of Suetonius. He would not "mistrust, and say, 'but time escapes.'" He collated the most important manuscripts, or had them accessible in photographs. His mind was stored with the unwritten essentials for a new interpretation of the text. But of his study of the historian there remain only three articles that he was induced to print, and a work of lasting importance, the *Index Verborum*, prepared with the assistance of his colleague Jackson. Himself skilled in the theory and an adept in the art of music, his article on the *αὐλός* or tibia, supplemented by one on the mouthpiece of the *αὐλός*, made him an authority on the form of the ancient flute.

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[1] He coöperated with Goodwin and White in their edition of the *Anabasis;* completed Lane's *Latin Grammar;* translated Xenophon *On Horsemanship;* edited *Eight Orations of Lysias.* His *Addresses and Essays* contain the garnered fruit of seventeen years of scholarly work.

Howard was a unique compound of opposing qualities. At times you might think him a pessimist. In criticism he was sharp, even violent, unsparing even of his friends. If he thought the College was lowering its standard he was a veritable Jeremiah in his wrath. If to have some strong prejudices is good for a man, he was well ballasted therewith. On the other hand, he was ready with offices of kindness for all. He gave himself to the uttermost in helping his pupils, his friends and colleagues. Allen and Greenough's Latin Grammar owed much to him. He completed Paine's History of Music and Morgan's translation of Vitruvius, each unfinished at its author's death; yet from his modest statement as to his own part no one could tell how much both works were indebted to his varied learning. Would that all scholars whose long cherished dreams are unrealized might find another Howard when the final silence comes upon their lips!

The living will gladly resign to the dead the honor of ampler appreciation.

Clifford H. Moore (A.B. 1889, PH.D. Munich 1897) taught Greek and Latin from 1898 to 1905, thereafter Latin alone — as Pope Professor since 1926. The scope of his instruction includes such varied courses as History of Latin Literature, Plautus, Roman Comedy and its Relation to Modern Comedy, Caesar, Roman Historians to Tacitus, Latin Poetry of the Fourth and Fifth Centuries, the Roman Novel, Roman Provincial Administration, Latin Epigraphy, Survey of Roman Civilization, Philosophy and Religion in Greek Literature, Religion and Worship of the Greeks.[1]

Charles B. Gulick (A.B. 1890, PH.D. 1894) has been teaching Greek for thirty-six years, since 1925 as Eliot Professor. His interests cover a wide field: Critical Introduction to Homer, Pindar, Herodotus, Euripides, Aristophanes, History of the Greek Drama, Plato and Aristotle, the Bucolic Poets, Herodas,

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[1] His publications include *Religious Thought of the Greeks* (1916), *Pagan Ideas of Immortality* (1918), and an edition of Horace's *Odes and Epodes* (1902).

GEORGE MARTIN LANE

EDWARD KENNARD RAND

Mythology, Palaeography, Grammar, Survey of Greek Civilization.[1]

Edward Kennard Rand (A.B. 1894, PH.D. Munich 1900), teacher of Latin since 1901, is a humanist in his interests: Cicero and Humanism, Platonism from Cicero to Boethius, Later Roman Philosophy, the Classical Pastoral and the Latin Pastoral of the Middle Ages, History of Classical Culture in the Middle Ages, Boethius and his Relation to Ancient and Modern Thought. On Boethius and Latin palaeography he is an authority. He is one of the few classicists who have used their knowledge of the history and literature of antiquity to elucidate the Middle Ages.[2]

Instruction in Classical Archaeology, with special courses on the topography and monuments of Athens and Rome, vase-painting, numismatics, and the elder Pliny's account of the history of ancient art, has been given for the last twenty-five years by George H. Chase (A.B. 1896, PH.D. 1900), Professor of Archaeology.[3]

James Hardy Ropes (A.B. 1889), who has had charge of the New Testament department in the Divinity School since 1895 (Hollis Professor since 1900), has given courses on New Testament Greek of the greatest value to the Department of the Classics.

Carl N. Jackson (A.B. 1898, PH.D. 1901) has given instruction in both classical languages since 1905. Among the specially important courses of which he has charge are Beginners' Greek, the Proseminary, and the History of Classical Greek Literature. His graduate work has dealt with Lucian and his Times, the Late Roman Epic, Roman Oratory, and Greek and Roman Literary Criticism.

The adjustment of one interest to another is represented by Chandler R. Post (A.B. 1904, PH.D. 1909), who has taught Greek and Fine Arts since 1910. In Greek he has given instruction to undergraduates and graduates — to the latter, courses on Greek Culture in the Sixth Century B.C., Menander, Sophocles, and on Italian and Spanish art and culture.[4]

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[1] Author of *The Life of the Ancient Greeks* (1902), *Modern Traits in Old Greek Life* (1926); editor and translator of Athenaeus in the Loeb Library.

[2] Author of *Ovid and his Influence* (1925), *Founders of the Middle Ages* (1928); editor and translator of Boethius' *Consolation of Philosophy* and *Theological Tractates.*

[3] See Dean Chase's chapter on the Fine Arts, below.

[4] Among his writings are papers on the dramatic art of Aeschylus, of Sophocles, and of Menander, 'The Development of Motion in Archaic Greek Sculpture'; *Mediaeval*

William Chase Greene (A.B. 1911, PH.D. 1917) has taught Greek and Latin since 1920: in the middle group, Virgil; in the group 'primarily for graduates,' Democracy and Imperialism in Athens of the Fifth Century B.C., Plato, and the Latin Elegy.[1]

John B. Titchener (PH.D. Illinois 1923) has given instruction in Greek and Latin since 1925; in the Graduate School on Pre-Socratic Philosophers and on Plutarch.

With the appointment in 1926 of Joshua Whatmough (M.A. Cambridge 1926) instruction in Comparative Philology finally became systematic, comprising courses on the History of the Greek and Latin Languages (sounds, inflexions, dialects, syntax).[2]

Lionel D. Peterkin (B.A. Durham 1911) began in 1926 to teach Greek and Latin at Harvard. With advanced students he has traced the classical influence in English literature.

From 1901 to his resignation in 1925, advanced Greek courses given by the writer of this chapter were History of Greek Literature in the Classical Period, in the Alexandrian and in the Roman Age, Technique of the Greek Drama, Lyric Poetry, Pindar, Aeschylus, Euripides, the Epigram, Thucydides, Syntax, Epigraphy, Palaeography, and Metric.[3]

3. Instruction in the Graduate School

Before 1875 the resident graduate student of the Classics had to content himself with private reading and instruction designed for older undergraduates. Graduate courses were first offered in 1875. In 1890, when the Graduate Department became the Graduate School, courses in the Classics make their first appearance under the designation 'Classical Philology.' With the expansion of the School, courses were gradually provided, which now cover the whole field of Classical Philology: Literature (the New Testament included), History of the Clas-

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Spanish Allegory (1915), *A History of European and American Sculpture* (1921), and (with G. H. Chase) *A History of Sculpture* (1925).

[1] Publications: Newdigate prize poem, 1912; *The Achievement of Greece, A Chapter in Human Experience* (1923), and studies on Plato in the *Harv. Stud. Class. Philol.*

[2] Author of *Liber Glossarum* (with W. M. Lindsay and others), *Scholia Vallicelliana, Pre-Italic Dialects of Italy.*

[3] Author of *The Ionic Dialect* (1884), *Greek Melic Poetry* (1900), *Aeschylean Tragedy* (1923), *Greek Grammar for Colleges* (1910), *Greek Grammar for Schools* (1916); editor and translator of Aeschylus.

sical Languages, Political Antiquities, History, Epigraphy, Palaeography, Religion and Mythology, Philosophy, Ancient Art, Archaeology, and the History of Classical Studies. George Ticknor could no longer declare, as he did in 1815, that 'we do not yet know what a Greek scholar is.' [1] Under the new dispensation Harvard men have claimed their part in the heritage of classical learning descended from the Renaissance, and have found a place in the hierarchy of classical scholarship.

Graduate studies, with the elective system, have had a radical influence on the range and effectiveness of teaching, and on the productivity of the teacher. The resort to European universities of men wishing to supplement their Harvard training has declined. Classical students now find the springs of inspiration at home, and more personal attention to their individual needs than they could obtain abroad. For many years it has been more common for them, after the doctorate is obtained, to familiarize themselves with European methods by residence abroad, or, as holders of fellowships, to visit the Holy Lands of classical antiquity.

Graduate instruction in Classics seeks to train men both to transmit an intellectual inheritance and to give technical and professional training to prospective teachers and investigators. On entering the Graduate School the classical student is introduced to scientific methods and research, but is not ripe for actual research until he has been trained in text-criticism and interpretation by the methods pursued in the Proseminary and the Seminary.

Candidates for the degree of Ph.D. must now present a thesis, written *in Latin* (a requirement exacted perhaps only at Harvard among our universities), prove their ability to write Greek and Latin prose, pass two written examinations in the translation of Greek and Latin authors at least one year before they present themselves for the degree, and an oral examination (but only after the thesis has been accepted) testing their general knowledge of classical philology, their knowledge of Greek and Latin literature, and their intimate knowledge of one Greek and one Latin author. The rigor of training to meet the requirements is not surpassed by that in any other university of our land. An eminent merit is its equal insistence on Latin and on Greek.

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[1] In the English reprint of Everett's translation of Buttmann's *Greek Grammar* (1822), the English publisher curtailed 'Cambridge, Mass.' at the end of the preface by omitting the name of the State, in the evident belief that the trans-Atlantic daughter was incapable of bearing Greek offspring.

The degree of Ph.D. in Classical Philology, first established in 1872, has been conferred on more than one hundred men.[1]

The master's degree may be received in one year upon the completion with distinction of four related courses in Classics, or in related courses in other subjects chosen from those intended 'Primarily for Graduates' and 'For Undergraduates and Graduates.' Greek or Latin may be studied in equal proportion or the one made entirely or partially subordinate to the other; but no one is recommended for the degree who does not possess the knowledge of Greek required in 'Advanced Greek' for admission (Xenophon and Homer).

Here may be mentioned certain matters of interest to all students of the classics. In public readings portions of many of the chief classical authors have been translated by members of the staff. Attention to Homer, Sophocles, Plato, Aristotle, Virgil, and Horace is given in the public lectures on 'Great Authors,' established as a result of the General Examinations required of students concentrating in ancient and modern literature. On the fund donated by Gardiner M. Lane (A.B. 1881) open lectures have been given by distinguished scholars from Great Britain and the United States: S. H. Butcher of Edinburgh,[2] Gilbert Murray of Oxford,[3] J. B. Bury[4] and J. E. Sandys[5] of Cambridge; and Paul Shorey (A.B. 1878) of Chicago. Other public lectures have been given by members of the Department.

Probably the first attempt in the United States to produce an ancient classical play in the language of the original was made in 1881, when students of the University gave the *Œdipus*

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[1] Eight Harvard professors of the Classics received their degree of Ph.D. from Harvard. Of these William Everett was the first (1875), J. W. White the second (1877). Twenty-seven other recipients of the Harvard degree have been instructors or tutors in the College. Forty-four different colleges, exclusive of Harvard, have had, or still have, as professors of Greek or Latin, or of both, at least fifty Harvard Doctors in Philosophy, sixteen of whom had held positions at Harvard.

[2] Published as *Harvard Lectures on Greek Subjects* (1904).

[3] Published as *The Rise of the Greek Epic* (1911). As the first holder of the Norton Chair of Poetry, he gave lectures published as *The Classical Tradition in Poetry* (1927).

[4] Published as *The Ancient Greek Historians* (1909).

[5] Published as *Harvard Lectures on the Revival of Learning* (1905).

Tyrannus in Sanders Theatre.[1] In 1894 the *Phormio* was given; in 1906 the *Agamemnon*, in the Stadium. Scenes from the *Birds* were given by members of the Classical Club, the sessions of which include some form of literary exercise, and enable students and instructors to meet informally. Within the period here treated have been established a large special classical library and collections of classical antiquities, including about five thousand slides illustrative of Greek and Roman life, and about two thousand photographs. A goodly number of scholarships and fellowships has been provided for students in the Classics.[2]

The foundation of the American School of Classical Studies at Athens and that in Rome has given opportunities for inspiration and instruction both to many students of the College and to many members of the Department who have served as Directors or as Annual Professors.

4. Undergraduate Instruction

A century ago the instructor in the Classics sought only to discover whether his pupils had prepared the prescribed lesson. In some subjects there were lectures; none, so far as I can find, in the Classics. In the third quarter of the nineteenth century, the teaching at Harvard was chiefly by recitation, with written examinations (begun in 1859) in place of daily marks, a system which laid an intolerable burden on the instructor and practically prevented him from dealing with any large subject or interpreting adequately any single work of literature. With some noteworthy exceptions, when the student had translated, it was customary for the teacher to correct the translation, to ask questions (often about grammar), and sometimes to make comments, which rarely freed themselves from the implication of the text. With degrees of emphasis, varied in accordance with the needs of the class and the personality of the teacher, the later method has combined recitation with lectures, more or less formal. For the younger undergraduate the recitation preserves continuity of guidance in the form of instruction already familiar to him. For the more advanced student it is still of advantage as a test of his understanding of the text; but has often been wisely supplemented by continuous translation on the part of the instructor. The aim of the Department in later times has been to devise methods of instruction that concern themselves rather with the individual than with the group: to encourage him to read for himself, and to make himself less dependent on formal courses.

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[1] Henry Norman, *The Harvard Greek Play*. Boston, 1882.

[2] The William Samuel Eliot Scholarship (founded in 1875), the George Emerson Lowell Scholarships (1886), the Charles Haven Goodwin Scholarship (1889), the William Henry Gove Scholarship (1921), the Charles Eliot Norton Fellowship in Greek Studies endowed by James Loeb in 1901, the William Watson Goodwin Fellowship, established in 1915 from the estate of Professor Goodwin, the Albert and Anna Howard Fellowship, founded in 1926 by Mrs. Howard in memory of her husband, Professor Howard, and the Arthur Deloraine Corey Fellowship, established in 1928 by Mrs. Corey in memory of her son. A Bowdoin Prize for graduates is awarded for an original essay in either Greek or Latin.

In effecting these improvements in instruction which seek a closer understanding of the needs of the individual student the tutorial system has been of preëminent value. First adopted by the Department for the Class of 1922, tutoring required in 1928–29 a large portion of the time of eight instructors. In the introductory courses, and in the regular first-year courses, in Greek and Latin, the tutors direct the reading of the students and conduct oral discussions in small groups, to the end that ancient civilization may be presented in a systematic survey that provides both for further study in the Classics and for the study of modern literature. Students concentrating in the Classics, or in any field of study of which the Classics form a substantial part, consult the tutors with regard to their programmes as a whole, meet them at regular intervals in private conference, and receive guidance in the correlation of their work and in the pursuit of their special interests. By the writing of many short essays, which they discuss with their tutors, they learn to express independent judgments and to make critical comparisons within the classical literatures and with modern literatures. Part of the students' reading with the tutors is done in preparation for their general examinations; and candidates for Honors are trained in the reading of Greek and Latin at sight. The primary purpose of the tutors is to help their pupils to read with understanding and enjoyment, and to form a discriminating taste. The success of the tutorial system in the Classics is chiefly due to William Chase Greene.

It has long been found advisable at Harvard to allow students in the Classics, without regard to their collegiate standing, to elect courses for which they are qualified by ability or special interest. In 1870–71, with permission, Sophomores and Seniors might take certain Junior courses, and Juniors might elect Senior courses. The sharp line of cleavage between the four College classes, and between graduates and undergraduates, has now disappeared. By this interlocking system, College and University are united in a manner peculiarly suited to the welfare of both.

Equally significant with the change in the character has been the change in the subjects of instruction. The Department has been at once conservative and progressive. It has maintained the courses approved by experience as necessary for the orderly progress of the student. It has experimented with new courses, some of which (sometimes in a developed form) have held ground, while others have had a more or less impermanent life. Both the older and the newer subjects of instruction now aim to broaden the student's horizon by inviting his attention to the meaning of the civilization of Greece and Rome, to the content of their literatures, to the historical place of the authors, to their literary and other influence on modern civilization. The range of instruction has been appreciably enlarged in the endeavor to bring the Classics into correlation with other languages and literatures and to provide those students whose main interests lie in other fields with the opportunity to come into contact with the spirit of classical literature and to discover the pertinence of ancient thought to the problems that still engage the minds of men.

A review of the courses in Greek and Latin will show the older and the newer constituents of instruction. In the first line come those courses, once pre-collegiate, introduced because of the abolition in 1884 of prescribed Greek and Latin for Freshmen. In 1883, under compulsion, Greek was studied by 247, Latin by 236, first-year men. The effect of the new system upon the number of Freshmen who, in one of more courses, elected Classics from 1884 to 1900, is seen from the following tabulation:

	Freshmen Total Number	Percentage Electing Greek	Percentage Electing Latin
1884	258	64	77
1890	367	36	56
1896	416	28	48
1900	537	16	30

To take the place of prescribed Classics for Freshmen, courses in Homer and in Latin Prose and Poetry, including Cicero and Virgil, were introduced in 1884. The decline in the number of Freshmen electing Greek foreshadowed the introduction of Beginners' Greek, a course first offered in 1899 and continued ever since. The course in Latin Prose and Poetry was designed to supplement the preparation of students who had presented Elementary Latin for admission, which presupposed three school years' study of the language. The courses in Beginners' Greek and in Homer were designed, if taken in sequence, to supply the needs of those students who had not studied Greek through at least three school years. The course in Homer was intended for those whose two years of preparatory Greek had not carried them beyond the reading of Attic prose. The College thus gives instruction once the function of the secondary school.

The course in Beginners' Greek, conducted with remarkable skill by Jackson, has been taken by 555 students in the last twenty-three years.[1] Three of these students attained the Ph.D. degree in Classical Philology, twenty others in such varied fields as Indic Philology, Semitic Languages, Romance Philology, English, Fine Arts, Economics, Mathematics, Philosophy, and Geology. Of this number one is now teaching in the Semitic Department, another has been Visiting Professor in English. Two of the beginners who did not take the doctor's degree are now teachers at Harvard. Experience proves that students beginning Greek relatively late may still attain distinction.

The disadvantages of the present system are not to be blinked. Beginners' Greek does not wholly redress the mischief. The College must now, almost unaided, furnish the prepared material for the profession. The future teacher of Greek who begins the study in College has now, unless he proceeds to the Graduate School, at most only four years to prepare himself for a vocation to which he formerly devoted six or seven years. Postponement of instruction in the elements of the language not only weakens the effectiveness of the teaching by shortening the time; it lowers the standard, encourages the schools still further to withdraw Greek from their curriculum, and removes from them something of the ideal function of preparatory as distinct from collegiate instruction.

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[1] Of the 609 colleges in the United States listed by the United States Bureau of Education in 1922–23, 470 offered instruction in the elements of the language. Until the nineteenth century Greek was not obligatory for matriculation at Oxford and Cambridge. Both universities have thus far found insuperable difficulties in the way of introducing instruction in the elements of the language.

In the first-year college courses in Greek and in Latin, prose is read before poetry. Among the authors Plato (Apology and Crito), Livy, Horace (Odes and Epodes) have long held a fixed place. Herodotus is now preferred to Lysias. Harvard is perhaps unique in introducing the younger student to Greek lyric poetry before he makes acquaintance with Greek tragedy, usually *Iphigeneia among the Taurians*. Introductory lectures comprised such subjects as Socrates and Plato, Greek Lyric and Elegiac Poetry, the Greek Theatre and Dramatic Performances, the Roman Historians, Plautus and Terence, the Roman Theatre, the Metrical and Musical Element in Roman Comedy.

To the student in his second year an option was long permitted. He might elect the 'regular' course: in Greek generally the *Birds*, Thucydides vi–vii, *Prometheus*, *Œdipus Tyrannus;* in Latin generally Catullus, Horace (Satires and Epistles) Tacitus (Agricola and Annals). Or, until about ten years ago, he might choose a more 'literary' course: in Greek often Herodotus vii–viii, the *Persians*, Thucydides i, the *Knights*, *Hippolytus;* in Latin a general view of poetry.

During a great part of the period under consideration the student in his third year commonly read Aeschines and Demosthenes On the Crown, a tragedy of Aeschylus or Sophocles and a comedy, usually the *Frogs;* and selections from Suetonius, Pliny, Juvenal, and Martial.

In his fourth year he proceeded to Plato and Aristotle (Senior Greek since 1870), Lucretius and Cicero (Tusculan Disputations) with selections from other writers. A striking innovation was the abolition of the old-time courses for third-year students and the substitution therefor either of those previously assigned to students in their last year, or of new courses, notably those in the rapid reading of Homer and Virgil. The course in the History of Greek Literature and that in the History of Latin Literature, both requiring collateral reading of large amounts of poetry and prose, varied in accordance with the needs of the individual student, now became the most advanced course for undergraduates, but open to students who had passed with credit second-year Greek and Latin, and to graduates.

In the courses for younger undergraduates, linguistic training, though often needed to repair the frequent lack of sound foundation, has been subordinated to the desire to secure that first-hand acquaintance with the literature which ensures appreciation of its contents and prevents degeneration into literary dilettantism. Continual insistence on grammar as an end in itself has long vanished from the courses for undergraduates, which are now practically all literary and historical. At no time have there been less than two courses in composition in both languages. No student is ordinarily recommended for a position as a teacher of the Classics unless he has studied both Greek and Latin composition.

Lectures on Greek and Latin literature were obligatory for Juniors in 1851–52, for Freshmen first in 1875–76. In 1889–90 and thereafter for some time, they were given by various professors in the form of introductions to the authors read by students electing Freshman Greek and Latin. Lectures on classical literature still form a part of the courses in the first year of collegiate Greek and Latin. The need of more systematic instruction in the entire field of classical literature led to the introduction of whole courses on Greek Literature in 1884, on Latin Literature in 1885; and, with some intervals, these have remained integral parts of the advanced instruction.

Courses in 'reading at sight,' or for 'facility in reading,' favored especially by Greenough and White, have held a place under other forms. To properly qualified undergraduates certain courses, even those primarily intended for graduates, have been opened in the major Greek and Latin authors, whose works are read both intensively and extensively.

Until some fifty years ago the study of the Classics meant for the Harvard undergraduate primarily the reading of the texts of the best Greek and Latin authors accompanied by composition in both languages. That the ancient Greeks and Romans had been actual living human beings the student did not realize. Of their ideals he knew little or nothing. His horizon did not include their private and their institutional life, their art in its various forms apart from literature, their political history beyond the simplest facts, and the history of their speech. An enlargement in the scope of humanistic studies in one of its most important phases began in 1881–82, when systematic courses were offered on the Private Life of the Greeks and the Private

Life of the Romans, subjects now included in the expanded forms entitled A Survey of Greek Civilization and A Survey of Roman Civilization. Instruction in Classical Archaeology was offered (first in 1909–10) to all students of classical antiquity and others as a general introduction to the history and results of modern archaeological research, with emphasis on the relation of Greek art to Greek and Roman literature. The study of ancient history did not become systematized until 1908. Greek and Latin Comparative Philology, introduced by Greenough in 1875–76, did not attain an established position until Whatmough came in 1926. The history of the Greek and Latin languages now forms a part of the regular programme.

A novel departure from tradition was the establishment of courses not absolutely requiring a knowledge of Greek or Latin. Such were those before mentioned on the civilization of the Greeks and Romans, and (an especially important innovation) a History of Greek Drama, first offered in 1898. We are not unaware of the limitations of such means of approach to the spirit of classical antiquity: they are substitutes, aiming to secure results without the best process, and tending to tempt even classical specialists away from the study of the originals. But all use of translations is not anathema to us. We believe that certain works, in part or whole, of ancient authors which convey only substantive information, may under certain conditions be profitably read in translation even by students of the Classics; but we are not under the delusion that any reproduction, or recreation, in English of Greek *poetry*, can even pretend to transfer to the Greekless the life, the light, and the music of the original. The power and charm of the greatest literature cannot be divorced from the power and charm of the language; and only by an understanding of the original is it possible to prevent sentimental misconceptions of the Greek spirit. Still, the courses in question offer to non-classical students the opportunity to imbibe something of the spirit of ancient life and literature; and thereby avert from "the humanities" even the suspicion of being only a specialized branch of study.

Honors for distinguished excellence have been awarded in the Classics and in Mathematics longer than in other subjects. Second-year Honors in the Classics, first awarded in 1872 and later much prized (won by seventy-six candidates in 1882–85), were discontinued in 1926, because other departments did not award such honors, and because few students then entered with enough Greek to win them. The requirements for Final Honors, established in 1872, are eight courses, of which, ordinarily, at least five should be in Greek or Latin literature or composition, while as many as three may be in History, Philosophy, Fine Arts, or Modern Literature. Examinations are set in the translation of Greek and Latin authors at sight, in the literatures of Greece and Rome, and in Greek and Latin composition (except for those who seek Honors of the lowest of the three grades). Students concentrating in the Classics numbered in 1925–26 fifty-six, in 1926–27 fifty-two; of whom in the former year forty-one, in the latter year thirty-two, sought Honors.

It is cause for congratulation that the battle of the Ancients and the Moderns, vigorously waged in some institutions, finds no place at Harvard. The Department encourages students who wish to combine classical with some other study in their 'field of concentration.' The first step was taken when the Divisions of Ancient and Modern Languages instituted Honors in Literature (announced in 1903), in which either of the ancient may be combined with one of the modern literatures. Other combinations were effected later. In History and Literature, the student may select the history and literature of Greece or of Rome, or of a period of classical antiquity. Honors may also be sought by combining Classics with Philosophy, Fine Arts, History, Government, or Economics (four courses in the Classics, two in the other field, with written examinations on the literature of Greece and Rome and on the allied subject).

An event of unusual moment was the introduction in 1922 by the Divisions of Ancient and Modern Languages of a new paper in the General Examinations for the A.B. in these two Divisions. This new paper contains questions on ten books of the Bible and twelve plays of Shakspere for all students in these Divisions, on two ancient authors for students of modern literature, and on two modern authors for students of ancient literature. The choice of modern authors is restricted to Dante, Cervantes, Chaucer, Milton, Molière, and Goethe. These examinations are administered by a Committee of Five, which approves the paper prepared by a Committee of Examination, and which in its composite membership is a symbol of the confederation of the two Divisions and of the unity of all literature.

Nevertheless, a large majority of Harvard undergraduates go through College without taking any Classics. Even students of a modern literature are loath to ascend the stream of that literature to seek its undying fountain-head. Knowledge of Greek or Latin is rarely, if ever, acquired once a man has passed into 'active' life. Many a student on graduation, and many a man in his maturer years, has lamented a loss that repentance may not repair.

The Harvard teacher of the Classics is now confronted by the fact that a 'liberal' education, as now understood, no longer requires Greek and Latin as an indispensable substratum, even for the study of literature in general. Yet he does not dream of reëstablishing any creed outworn by reason of its irrational rigidities. He is persuaded that every one should have an opportunity to apprehend and assimilate new truth, to satisfy his legitimate intellectual desires, and even to form a reasonable basis for a prediction of his ultimate sphere of activity. The elective system has made the instructor of the Classics, no less than his pupil, a free man, the one responsible to the other, bound together by mutual understanding born of a common aim. He has been freed from the passive or unsympathetic loyalties of unqualified or unwilling pupils, unappeased by the reflection that they lay under a compulsion profitable only to their competent and willing classmates. His instruction has gained in effectiveness as he has secured a fairer opportunity to awaken or to foster an enthusiastic appreciation of the masterpieces of two great literatures.

POSTSCRIPTUM

By Lucien Price (a.b. 1907)

In my senior year the Classics Department gave its performance of the *Agamemnon* of Aeschylus at the Harvard Stadium. In peril at one time of being a dismal failure, it ended by proving a brilliant success. This was in part thanks to the dramatic coaching of the late George Riddle, but behind it all was solid scholarship, and much of that scholarship, the play being Aeschylean, was Professor Smyth's. It was my good luck (or should I thank the gods of Hellas?) to have read the *Agamemnon* under Professor Smyth the previous winter. This was a major experience. I can only liken it to playing in a symphony orchestra under an eminent conductor. It was my first intimation that the Greek tragic poets might possess a higher wisdom than Biblical prophets, with greater majesty of form and content. The Professor himself lent impressiveness to the matter. A head strikingly sculpturesque, a voice deep and resonant, a manner grave as befitted the subject, he was a magnificent figure. We called him 'Olympian Zeus.' His scholarship parted curtains behind curtains of revelation. One gained respect for hard study and pleasure in it. Professor Smyth never knew the admiration which he inspired. Teachers seldom do. It is the stern condition of their task that they seed the ground and let others reap the harvest. Yet so well did he sow this particular field that certain choric odes of the *Agamemnon* and certain lyrics of the Greek Anthology have gone on ringing in my ears ever since; and for twenty-two years, three Greek texts of Aeschylus have never left my writing table: the *Choephoroi*, the *Prometheus Bound*, and the *Agamemnon*. Remembering that Julia Ward Howe took the trouble to learn Greek at the age of forty-eight, I have taken care not to unlearn mine since the age of twenty-four.

Greek is no lost cause. Living and working largely in a world of daily journalism, quite outside the prescribed area of classical studies, I can nevertheless see signs innumerable that America is only just entering upon its classical heritage, that in decades to come Greece will exert as profound — perhaps a much more profound — influence on our development, than Judaea has in the past. Classical scholars lay foundations underground. Later ages build the temples. But when time has wrecked the temples, it is these foundations which enable us to trace their ground-plans and reconstitute their elevations.

III. THE MODERN LANGUAGES

1869–1929

By Charles H. Grandgent, Litt.D.
Professor of Romance Languages

1. The Older Generation

GROWTH, extensive and intensive — bewildering growth has transformed all the departments of higher education. In this development the Modern Languages have had their share. But inasmuch as each branch of instruction must needs expand in its own particular way, an examination of our neophilological past over a considerable series of years will disclose certain tendencies, certain struggles which may be regarded as peculiar to the philological domain. One is the persistent though belated effort of the mother tongue to establish itself as a subject of study. Another is the adjustment of modern foreign languages to the rest of the curriculum.

The former contest, despite its amazingly recent birth, has long since achieved complete and glorious success. The latter, spreading over a century or so, has not yet reached its conclusion. German, French, and the rest, to be sure, have since the early days of the imperious and foresighted George Ticknor held an honorable place on the programme; but the extent to which these tongues must be regarded as a necessary adjunct to work in other fields is still a subject of perennial discussion and biennial legislation. The Moderns have thus inherited the feud of the Classics — though without entirely relieving their quondam rivals.

Rivals indeed — sometimes bitter opponents — were the Ancients and the Moderns for many decades, at first in competition for recognition in requirements for the degree, later in more acrimonious dispute for precedence in examinations for admission. Of a sudden, however, their attitude has changed, each of the two parties having perceived in the other its natural ally in self-preserving resistance to the pressure of newer interests. Even so have the Irish, in our northeastern states, clasped hands with Anglo-Saxons in alarm over the advent of the Argentines and the Portuguese and the Greeks.

As to English, its advance has been more in the nature of peaceful penetration. Its delay in getting started seems to have been due, not to opposition, but to a general failure to see in it anything more than a minor element in preparation for the ministry. English meant elocution and rhetoric, as late as the sixties. In 1858–59 the Freshmen had Lessons in Orthoepy and Lessons in Expression; the Sophomores, Lessons in Expression, Lessons in Action, Themes; the Juniors, Themes, Declamation, Rhetoric; the Seniors, Forensics: nothing more. In that same year, however, James Russell Lowell, Smith Professor of the French and Spanish languages and Professor of Belles-Lettres, was offering to Seniors an elective course of lectures on Modern Literature; Sophomores and Juniors had opportunity to study French, culminating in Molière; Juniors and Seniors might pursue German into Auerbach and Goethe, or Spanish into Cervantes, Lope de Vega, Calderon, and Moratin; while Seniors were entitled to a dose of Italian with Luigi Monti — Longfellow's 'Sicilian,' who was then in his last year with us. Monti's Italian Grammar and Reader were in service. The Spanish text-books, by the way, were mostly editions prepared, with notes, by Francis Sales; the German Reader was by Charles Follen. The instructor in German was George Adam Schmitt, soon destined to have leave of absence for service in the Civil War, after which Harvard never saw him again. Those were the pioneer days.

Francis James Child (A.B. 1846), then thirty-three, was already Boylston Professor of Rhetoric and Oratory. Child it was who first saw the possibilities of English as a factor in general scholarship. For he had vision, as well as the most scrupulous accuracy and everlasting perseverance. A romantic vein was in him, too, a taste for the archaic and the popular. His English and Scottish Popular Ballads, the publication of which began in 1857, put him into the very forefront of the world's scholars. An edition of Four Old Plays, and his Observations on the Language of Chaucer, illustrate other aspects of his activity. A grand zest and a sunny disposition, a sense of duty and a love of fun made a compound irresistibly attractive. None who knew him can recall without tenderness his curly hair, his fine brow, his concentrated, expressive features, his short, sturdy figure, his heedless gait. One bitter note in his sweet cheeriness was sometimes aroused by the remembrance of the great proportion of his

FRANCIS J. CHILD

BARRETT WENDELL

life that had been spent on theme-correcting. Not until 1876 did he become Professor of English, bequeathing to Adams Sherman Hill (A.B. 1853) the Professorship of Rhetoric and Oratory.[1] Hill, a recruit from journalism, presently made himself known to the whole country with his Principles of Rhetoric. The catalogue of 1868-69 is the first to show 'English' as the designation of a field of study.

Meanwhile, on the foreign side, another important character appears on the scene. In 1861 Ferdinand Bôcher is announced as Instructor in French. A thoughtful, rather elegant young man of twenty-nine or thirty he was then, with a cane and a French accent — unusual, to be sure, in looks, but with little suggestion of his subsequent short-legged rotundity. Already his were the magnificent eyes and the impressive bass voice. Like Child, he was a book-lover, a reader, insatiably curious. An adroit practical linguist, he somehow acquired mastery of several languages, and soon came to write and speak English as if he had been born to it. For authorship, as for publicity in general, he had no liking. He did bring out an adaptation of Otto's French Grammar, which, being sorely needed, came into wide use; at a time when available reading-matter was scarce, he published some judiciously selected texts — the College Series of French Plays, a Reader, a novel or two: that was all. Yet he was essentially a literary man. A mind richly stored, a fascinating manner, a contagious enthusiasm, coupled with geniality and humor, made him an alluring guide to letters. And allure he did, drawing not only the studious but the habitually idle into acquaintance and familiarity with good authors. He amassed a huge library, which he stored in two rooms thrown into one, with shelves all around and books three deep; but he could always lay his hand on whatsoever volume he wanted. To this shrine he freely invited the inquisitive, and allowed them to browse at will.[2]

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[1] After Child's death in 1896, the sum of $10,000 was quickly and quietly subscribed for the endowment of a Memorial Library to bear his name; to this amount the surviving members of his class (Charles Eliot Norton and two others) added their Class Fund of $15,000. Purchases from the income of this fund have been combined with the small Department collection previously existing; thus has been formed the Child Memorial Library, the special library of the Department of English.

[2] When Bôcher died, in 1902, one of his devotees, James Hazen Hyde (A.B. 1898), purchased this collection and gave a large part of it to the College. It was particularly rich in Molière and Montaigne.

Bôcher's influence shows itself promptly in the offering of courses: French Literature in the sixteenth, seventeenth, and nineteenth Centuries; Lessons in French Etymology. In German, too, we note an attempt to change the reading from year to year. In 1865–66 French was obligatory in the Freshman and Sophomore years, optional in the Junior, where Spanish was optional also. The next year a term of German is prescribed for Sophomores. By 1868–69, French is obligatory for Freshmen, German for Sophomores; elective in subsequent years are German, Spanish, and Italian, which last may be taken even by Sophomores competent to read Tasso.

The College had lost Bôcher, in 1865, to the Institute of Technology; but in 1870 (his colleague Eliot having become President) he returned as Professor of Modern Languages. Another accession to the teaching force was the coming, in 1866, of Bennett Nash (A.B. 1856) as Instructor in Italian and Spanish. These subjects he taught, as Instructor and Professor, for thirty years. Of Italian upbringing, he was always a polished, kindly gentleman, fond of system, with a European culture and a Yankee devotion to duty.[1]

Associated with these two tongues, remembered as a teacher chiefly for his rather brief service as interpreter of Dante, was one of America's great writers, James Russell Lowell, incumbent of the Smith Professorship. A poetic, fanciful, eclectic garnerer in the field of letters, he ventured even into the mysterious Middle Ages. His pupils, never many, had the privilege of contact with a mind original and richly furnished.[2]

2. Administration

Did the Modern Language work grow because books came to it, or did it get books because it grew? The books were both cause and result, but mainly the latter. The same thing may be said of organization. From a comparatively amorphous state there developed Departments and Divisions as the need made itself felt; and this increase of specialization and direction has doubtless made study more effective.

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[1] Mrs. Nash, in 1924, bequeathed a fund of $67,000 for the purchase of books in his two favorite languages.

[2] The James Russell Lowell bequest of 837 volumes and 539 pamphlets from his library came in 1891; nine years later, another portion of his stock was purchased by subscription, and forms the main part of the Lowell Memorial Library of Romance Literature.

As we scan the Catalogues from year to year, we observe in 1872–73 a marked expansion. The pamphlet springs from provincial to almost cosmic dimensions. For one thing, it contains all the examination questions — both admission papers and collegiate papers. In these, by the way, our subjects are well represented — English, German, French, Italian, Spanish.

Entrance examinations, which will be considered in another volume of this history, have been of special concern to divisions such as ours, whose subject-matter is, in part at least, a subject of study from primary school days. The Catalogue for 1877–78 calls for a specified minimum acquisition in all the subjects listed, and a definite maximum attainment in any two. The next great change came in 1886, when all subjects for admission were presented in two lists, 'elementary' and 'advanced'; a modicum of both German and French was prescribed. After another dozen years, and a prolonged struggle, the '26-point' system, which maintained the same position of the Modern Languages, came in. That standing is even now virtually unaltered, both in the new 'Old Plan' and in the new 'New Plan,' although Freshman foreign language courses are no longer prescribed, while on the other hand a higher degree of proficiency is demanded.

By 1885–86, prescription in College was limited to English A,[1] Freshman German or French, twelve Sophomore themes, and Junior and Senior forensics (argumentative compositions). Forensics and Sophomore themes went the way of other things outlived, since they were made superfluous by the great amount of writing called for in the various courses. Indeed, there was (and perhaps is) cause to fear that constant scribbling may do more harm than good. German A and French A eventually ceased to be designated as obligatory, although some knowledge of both languages continued to be needed for the A.B. The sole remaining specifically required course is English A; and that huge concern which (despite many experiments) has never been carried on to anyone's satisfaction, is likely to follow the rest into the discard. Already a considerable number of students — those who obtain a grade of 75 per cent or better in entrance English — are exempted from it.

How can five hundred students be taught to write? A professor may lecture to them at stated intervals on literature and style; he may even call in other professors to talk about their specialties, thus providing possible topics for essays. Appropriate reading may be assigned. 'Section hands' may read aloud favorite authors and discuss matters of technique. Daily or weekly themes may be written by the army of pupils, and corrected and criticized by assistants of various degrees of competence. Yet this forced cultivation, however strenuous, does not, apparently, produce the growth desired. It was, by the way, the requirement of daily themes, which drove Robert Frost out of College. At present the professorial lectures are abandoned, and trust is put in close personal contact between small groups of students and the instructors in charge of them. Very informal talks are sometimes given by the latter, but their most important function is practical individual counsel.

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[1] A. S. Hill's *Rhetoric, Lectures, Written Exercises and Oral Discussions.* The description hardly changes, and the textbook not at all, from 1878 to 1914.

On the other hand, special provision has been made for those who in their College courses seem unable to write with passable correctness. We have now had for several years a Committee on the Use of English, with a Secretary who takes in hand the pupils reported to him by teachers in various Departments, gives them fatherly advice, and sees to it that they receive the steering that should be theirs. Appropriate treatment, too, is provided for foreigners.

Since the cessation of hostilities over terms of admission, the foreign languages have remained a bone of contention in the statement of terms for the degree. Some departments, other than linguistic, like to assign French or German books for their students to read. Thus it was discovered, to the peculiar horror of the historians, that, in spite of all our requirements, many of our lads cannot really understand French or German. It was then decided, in 1909, that all our charges absolutely must learn to comprehend one of these languages, and reading tests (strangely denominated 'oral') were devised *ad hoc*, without reference to courses. It immediately became evident, however, that the teachers in these apparently discredited courses must be the testers, because nobody else could do it. The historians, when individually asked to collaborate, promptly and very generally declared themselves incompetent. A similar response came from other departments which had appeared interested. It is natural, of course, that the administration of the test should be in the hands of the Modern Language staff; and so it was voted. But the big corps of examiners contemplated for the enterprise was expected to contain a much higher proportion of outsiders than the event disclosed.

The first conception of the trial was naïvely chimerical: a professor in his study, pulling down at random a volume from his bookcase and inviting the candidate to expound. Even before the flood-gates opened, the casual professor had given way to a large staff of examiners stationed in as many rooms as could be found vacant, at as many hours as the schedule could afford, each armed with a pile of record-cards and a supply of sheets containing a printed passage of French or German. Hour after hour, day after day, the candidates would enter, trembling, register at the desk, receive the printed sheet, con it for a stated number of minutes, and then, in a quavering voice, deliver what they conceived to be its message. The pieces chosen were pretty easy, but it made little difference; for the performance was a trial, not of language, but of self-possession. After several years of these so-called 'oral tests,' a written examination was substituted — translation of a passage of medium difficulty; and it is administered by two chief examiners, one for each language.

Later the requirement was restated as 'a reading knowledge of one language and an elementary knowledge of the other'; and the obligation must now be met before the beginning of the Junior year. The 'elementary knowledge' is proven by work in certain courses or admission examinations. Later yet, Latin was brought into the game, and a complicated choice of two out of three was concocted — futile to expound here, because it will doubtless be altered before these lines are read.

The brief special tests have never seemed a fair criterion — at any rate to the numerous unsuccessful aspirants. To the administrators it has seemed that we allow too many opportunities to repeat the examination, with the result that labor is needlessly augmented and that boys are tempted to trust again and again to luck, hoping by multiplicity of trial to win fortune's favor. Sundry modifications have been made in the procedure; but the puzzle still awaits a final solution.

The plan of elementary instruction in French and German has not changed radically during our period. Professor Bôcher, like his successors, believed in the efficacy of large amounts of reading, with a modicum of grammar and a restricted but careful training in translation and composition. Successive 'methods' with seductive titles, hotly discussed in pedagogical circles and tentatively adopted in a few colleges and many schools, have left Harvard unmoved. Skepticism with regard to the 'direct' mode (as applied to large classes) has been balanced, to be sure, by rapid movement and the avoidance of unnecessary routine. Special courses in writing and speaking the foreign languages have been provided in abundance, and, ever since the days of Ticknor, a number of courses in literature have been conducted wholly in the foreign tongue. The beginner's work, however, is still made up largely of translation and grammar, whether his linguistic field be ancient or modern. It should be noted that most Freshmen start their German in College, having come here with the rudiments of French already acquired; the problem of the first year is, then, a more important and difficult one in German than in French. For the great majority of boys, two full years seem to be needed, in either foreign language, for the winning of such mastery as may be useful to them in historical or scientific research.

Honors in Modern Languages, later called Honors in Modern Literature, were established in 1878; and this is the requirement: the candidate must read French and German easily at sight; he must have taken two courses in English, two in French, two in German (all selected from a given list), also he must pass a thorough examination in a chosen author. Honors in English were established four years further on; they call for six courses, one of them in composition. In due season came Honors in Romance Languages, in Germanic Languages, in History and Literature. The name Honors in Literature has come to designate a combination of Classic and Modern letters.[1] Honors are now conferred at graduation according to the plan inaugurated in 1907,[2] on the basis of the general examination, a thesis, and grades in 'concentration' courses. Generally speaking, the decision is based on the record in eight courses and on a thesis. For *magna* or *summa cum laude* in English or German, an oral examination is also required. Already there has been a startling increase in the list of candidates for Honors — owing in part, of course, to the general examinations and their attendant tutors. In our Division their number jumped in 1927–28 to over a hundred.

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[1] See Professor Smyth's chapter on the Classics.

[2] See Introductory chapter on College Studies.

The terms 'Department' and 'Division' are now so familiar that we conceive of them as having existed always; but neither is very old in our technical nomenclature. Departments were created in 1825; but courses of instruction were not grouped by departments in the catalogue until 1872. For the collection of Departments into Divisions we must look to 1891. Then Child became Chairman of the brand-new Division of Modern Languages, within which Adams Sherman Hill was Chairman of the Department of English, George Bartlett of the Department of German,[1] Bôcher of the Department of French, Norton of the Department of Italian and Spanish, Sheldon of the Department of Germanic and Romance Philology. Comparative Literature, that year at its very beginnings, was not organized as a Department. Again two years (1899–1900), and we come upon a union of the several Romance branches into one 'Department of French and other Romance Languages and Literatures.'[2] Later came Departments of Comparative Literature and Comparative Philology, belonging only in part to the Division of Modern Languages. Slavic and Celtic, taught by one man each, have not lent themselves to departmental organization.

In the development of Harvard from a college to a university, a vital factor has been the swelling troop of mature men desirous of pursuing advanced studies and of obtaining higher degrees. The Graduate Department of 1879–80, with a modest offering of six courses in Modern Languages, becomes in 1890 a Graduate School.[3] But there have been doctors of philosophy since 1873. Modern Languages were nearly in the van, for in 1876 Robert Grant (A.B. 1873) took the degree in English, Lucius Henry Buckingham (A.B. 1851) in Romance; oddly enough (for a degree borrowed from Germany) German was not represented until 1880. Nowadays, in this Division, the annual harvest of doctors is over twenty.

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The transformation of management and the accessions of books give but an inadequate idea of the immense enlargement and diversification of instruction which, under the impulse given by Child and Bôcher, characterized the sixty years following the inauguration of President Eliot. In this grand development Eliot, himself, was after all the prime mover; his successor has wisely directed the trend. At present, the movement seems to have achieved its purpose. We may look forward, no doubt, rather to stabilization than to increase of our bewilderingly variegated assortment of courses. We have, indeed, come to the belief that education will not suffer for the existence of some unchartered spots in the sea of knowledge, that the student often may gain more from the things he finds out or guesses than from the things we tell him, superior though the latter may be in fulness and accuracy. The period from 1869 to 1929, then, really does constitute an era (at least, as far as Modern Languages are concerned): the Era of Expansion.

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[1] Changed into 'Department of Germanic Languages and Literatures' in 1897.

[2] Since curtailed to 'Romance Languages and Literatures.' The earlier form was a concession to those who, for sentiment, hated to see the word 'French' disappear from the title.

[3] See Professor Haskins's chapter on the Graduate School.

3. Growth of the English Department

In the whole modern field, since the disappearance of Professor Child in 1896, the dominant figure has been that of George Lyman Kittredge (A.B. 1882), Child's disciple and worthy successor. Broad, almost universal, though his interests have been, the main currents may be indicated by the titles of some of his works: English and Scottish Popular Ballads, The Old Farmer and his Almanack, A Study of Gawain and the Green Knight, Chaucer and His Poetry, Witchcraft in Old and New England, and the book on Shakspere foreshadowed by his lectures. He appears in the catalogue as Instructor in English, in 1888–89; as Assistant Professor two years later; as Professor of English and Chairman of that Department, as Chairman of the Division, and as Chairman of the Department of Comparative Literature, he has for over thirty years been a presiding genius.

While Kittredge's concern has been more conspicuously with literature and folklore than with language, he is an expert also in this, and has contributed much to its scientific study, particularly in Old Norse and Old and Middle English. In Norse he was followed by William Henry Schofield, in English by Fred Norris Robinson (A.B. 1891).

Linguistics, literature, and composition are the three concerns of the Department. The second bulks largest. The first is never treated alone, but always in connection either with the second or (from a different point of view) with the third. In literary instruction, the method usually employed in elementary stages is a combination of lectures and assigned reading, often with essays or 'reports'; a higher stage calls for lectures, classroom analysis, and theses. For instruction in writing, the Department has little by little decreased its dose of theory and has come to depend more and more on actual practice closely supervised. *L'analyse de textes,* so effective in France, has apparently not been tried.

'Students are also required to be examined, as early as possible after their admission, in reading English. Prizes will be awarded for excellence. For 1870 students may prepare themselves in Craik's English of Shakespeare (Julius Caesar) or in Milton's Comus. Attention to Derivations and Critical Analysis is recommended.' So reads an announcement in the Catalogue for 1869–70. Elocution as a prescribed subject lingers a few years more, and becomes optional in 1873. Rhetoric, however, under Professor A. S. Hill, continues to be imposed on Sophomores and Juniors. Campbell, Whately, and Herbert Spencer greet students in their second year; and writing aplenty, under Hill, Child, and Palmer, falls to their lot in the last three quarters of their career. Evidently, however, some boys ask for more, for in 1877–79 two electives appear, one an Advanced Course in Rhetoric and Themes, the other devoted to Oral Discussion.

Three dates stand out, momentous.

1883: LeBaron Russell Briggs (A.B. 1875), who has been teaching Greek, is transferred to the English Department as Instructor to assist Hill in Sophomore Rhetoric.

1884: a new elective composition course, with a distinguished future before it, is launched by Barrett Wendell (A.B. 1877) — English 12.

1885: Sophomore Rhetoric becomes Freshman English A, with Hill and Briggs in charge, and an announcement that varies slightly in thirty years. Sophomore themes are not displaced, for all that; and forensics still abide with the Juniors and Seniors, under the ministration of Josiah Royce and Lewis E. Gates (A.B. 1884). Wendell takes over Hill's advanced composition course (English 5).

Subsequently these courses of Wendell's became identified respectively with Professors Copeland and Briggs. By 1896–97 (the first year bereft of Child) the composition courses have increased to eight — their present number. Three courses in Public Speaking have now replaced the two devoted to Argument and Elocution in that year.

Inasmuch as Elocution once formed (with Rhetoric) one of the two bases of instruction in English, it may not be amiss to cast a glance back at the cultivators of that art. To begin with, James Jennison (A.B. 1847) exercised from 1851 to 1860 the functions of Tutor in History, Instructor in Elocution, and Registrar. A little later all his time was given to Elocution; and as late as 1883 the memory of Tutor Jennison and his long service was still alive. By 1873 Elocution ceased to be a required subject; but instruction in it was still offered. Among the several appointments are those of George Riddle (A.B. 1874), who made a great name for himself by his performance of the title rôle in the *Œdipus Tyrannus*, and shortly afterwards attempted the professional stage; Henry Dixon Jones (A.B. 1881), who also was lured away by the profession; John J. Hayes, who won international appreciation for his renderings of Shakspere; Irvah L. Winter (A.B. 1886), whose fruitful service has lasted almost to the present day.

Such, in brief, is the history of English teaching on the 'practical' side. Who are the great teachers? After the long and distinguished leadership of A. S. Hill, critic witty and incisive, high priest of correctness and conformity to good usage, one naturally thinks of Wendell, who (ably seconded for a while by Gates) endeavored to develop individuality and freshness; one thinks of LeBaron Russell Briggs, with his happy compound of naturalness and fastidiousness, of precision, humor, and grace; one thinks of the clear and cogent fluency of Charles Townsend Copeland, who cut short a career as journalist and dramatic critic to join our staff in 1892–93 and for years held sway in English 12, while Briggs made English 5 his own.

Wendell, a highly original type, who under a more or less transparent mask of contrariness and eccentricity united creative power with sound critical sense, was the author of a number of interesting books: Cotton Mather, English Composition, The Duchess Emilia (a novel), The Literary History of America, William Shakspere, The Traditions of European Literature from Homer to Dante. This last title recalls the fruitful labor of his later years in Comparative Literature. His Harvard teaching began in 1880, and continued to 1917. Briggs is of course most widely known as Dean of Harvard College, a function which he took over in 1891, and as such he will ever be gratefully remembered by those who came under his direction. Had he not been a successful Dean, he doubtless would not have become President of Radcliffe College. And had he not held these two offices, the world would have lacked such books as Routine and Ideals and Men, Women, and Colleges. On the other hand, the world would have got, and surely would have cherished, more fruits of that genius which from 1889 on guided English 16 (History and Principles of English Versification), and which produced the altogether charming Original Charades and Riddles in Rhyme. Charles T. Copeland, of the Class of '82, has for years been a College favorite, and his influence as public reader, public and private lecturer, and private adviser has been great and beneficial. By his exquisite renderings and his very personal comments he has induced in countless hearers a love of those literary things which are really worth while.[1]

The successful teachers of composition have also been teachers of literature. In addition to those already discussed, one may cite George P. Baker (A.B. 1887), Byron Satterlee Hurlbut (A.B. 1887), Chester Noyes Greenough (A.B. 1898), Bliss Perry. Indeed, it would perhaps be more accurate to say that most teachers of literature have been also, incidentally, teachers of composition. Like Briggs, Hurlbut and Greenough (both of them authorities on different phases of eighteenth-century letters) interrupted their literary work to occupy the post of Dean.[2]

Among Harvard personalities of the last thirty years, few have been as well known as Baker, who joined us as Instructor in 1888 and left us in 1925 to accept an extraordinarily promising charge at Yale. He it was who developed the study of dramatic composition and production, so popular here and so much imitated elsewhere. His English 14 began in 1890–91; the famous '47 Workshop' was to come later.[3] English 14, dealing with the history of the drama, is now taught by Professor John Tucker Murray (A.B. 1899), author of English Dramatic Companies, 1558–1642.

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[1] Among his writings and editings are *Representative Biographies of English Men of Letters* (with F. W. C. Hersey, A.B. 1899), *Johnson and his Friendships*, *Edwin Booth*, and that inexhaustible mine of delight called *The Copeland Reader*.

[2] From Hurlbut's pen we have *Rambles about the College Yard*. To Greenough we owe several selections and editions. He collaborated with Barrett Wendell in his *History of Literature in America* and with F. W. C. Hersey in *English Composition*.

[3] Baker has edited many plays; he has written *The Development of Shakespeare as a Dramatist* and *Dramatic Technique;* he is responsible for two pageants: *A Pageant of Hollis Hall* (1913) and *The Pilgrim Spirit* (Plymouth, 1921).

Bliss Perry is not so much a professor turned man of letters as a man of letters functioning as professor. Already famous, he came from Princeton to Harvard in 1904. For a while he was editor of the *Atlantic Monthly*. Nearly all his works (biography and criticism) have to do with America. They are too many and too familiar to be named in full; here are a few specimens: The American Spirit in Literature, Walt Whitman, A Study of Poetry, The Heart of Emerson's Journals. Harvard has no better writer or speaker.

Another and earlier Perry, Thomas Sergeant Perry (A.B. 1866), 1845–1928, who here became Tutor in Modern Languages in 1868, and thirty years later went to Tokio as Professor of English, was primarily an author.[1] Freeman Snow (A.B. 1873) began as Instructor in Forensics in 1880, and proceeded to teach International Law in the History Department. William Roscoe Thayer (A.B. 1881), for a brief period Instructor in English (he came in 1888), turned out to be one of our country's foremost biographers. Assistant in English in 1894–95 was William Vaughn Moody (A.B. 1893), the poet and dramatist; but he did not stay long. Rideout belongs in this list — Henry Milner Rideout (A.B. 1899), the story-writer; for he was Instructor in English in 1900–04. Three new poets we have had in this century: Hermann Hagedorn (A.B. 1907), R. S. Hillyer (A.B. 1917), Daniel Sargent (A.B. 1913); and another new biographer, Rollo Walter Brown (A.M. 1905). William R. Castle (A.B. 1900), the diplomatist and novelist, was with us in 1905–11. Arthur Stanwood Pier (A.B. 1895) instructed in English from 1916 to 1921, and then released himself for editorship and authorship.

Others there are who, like Baker, have sought elsewhere the realization of their destiny. Francis Barton Gummere (A.B. 1875), Instructor in 1881, became the glory of Haverford and renowned everywhere for his Beginnings of Poetry and his translation of Beowulf. There is Kittredge's most distinguished pupil, John M. Manly (PH.D. 1890) who immediately went forth to Brown, then to the new Chicago, where he has long been head of the English Department. For us, indeed, he taught only one Summer School course, in Anglo-Saxon, in 1891–92. The popular William Lyon Phelps (A.M. 1891) gave us a trial in 1891. Jefferson B. Fletcher (A.B. 1887) began his career with us as Instructor in English in 1890, later to become head of the Department of Comparative Literature at Columbia.

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[1] *The Evolution of the Snob*, *From Opitz to Lessing*, *English Literature in the Eighteenth Century*, *A History of Greek Literature*, *John Fiske*, not to speak of the *Library of Adventure*, bear witness to his varied interests. See his Life, by John T. Morse, Jr., (1929).

Another deserter to Columbia is George Rice Carpenter (A.B. 1886), whose instructorship in English began here the year before Fletcher's, and whose creative activity, abbreviated by untimely death, brought forth biographies of Longfellow and Whitman. To California, whence he emerged but a few years ago, returns J. S. P. Tatlock (A.B. 1896), the Chaucer scholar. He, too, served apprenticeship here, as Assistant in English in 1902–03. He has produced many articles and several works on Chaucer, including an edition and a concordance to his complete works. During his all too brief second sojourn with us he has been Chairman of the Department of English. Two apostasies stand to the credit of that brilliant and versatile Scot, William Allan Neilson (A.M. 1896). Instructor in English here in 1900, captured by Columbia, recaptured by Harvard, he has become President of Smith College. In all these posts he has shown that singular aptitude which manifests itself in his edition of Shakspere, in his Chief Elizabethan Dramatists, in his Essentials of Poetry, in his Robert Burns. He wrote also a Life of President Eliot, whom he assisted in the compilation of the famous Five-foot Bookshelf. Another promotion to a presidency is that of K. C. M. Sills (PH.D. 1903), Assistant in English in 1901, now President of Bowdoin.

It is natural that a Graduate School of standards as high as ours should be continually sending men forth, and that our younger instructors, trained here, should be readily snapped up by other institutions. But if we have lost heavily, we have also made heavy gains. Clear profit, and very great profit, came with the acquisition of John Livingston Lowes (A.M. 1903) — one of our own doctors, to be sure — from Washington University, St. Louis, in 1918. Best known for his investigations and criticisms in modern letters, he has in all fields the expertness of a specialist. Particularly noteworthy are his Convention and Revolt in Poetry and his marvelously penetrating study of Coleridge entitled The Road to Xanadu.

Clear profit also was the very recent recapture of Hyder Edward Rollins (PH.D. 1916), an authority on the black-letter broadside ballad and editor of Tottel's Miscellany. Faithful from the beginning have been G. H. Maynadier[1] (A.B. 1889), dating from 1899, and K. G. T. Webster (A.B. 1893), dating from 1904. Coming to the other end of history, we find American literature cultivated not only by Greenough, Bliss Perry, Lowes, whom we have already met, but also by a new recruit, Kenneth B. Murdock (A.B. 1916), whose Increase Mather and Handkerchiefs from Paul give high promise.

We should not take leave of the English staff without mention of the beloved John Hays Gardiner (A.B. 1885), who began his career with us in 1892, and won merit by introducing the literary study of the Bible, now continued by Kirsopp Lake. He wrote The Forms of Prose Literature and The Bible as English Literature.

How has the Department's offering in literature increased under the ministration of such men as these? Here, in briefest outline, is the story.

Perhaps the most fruitful of all branches of literary instruction in the Department has been the course in Shakspere, English 2, which was founded by Child in 1876–77. Previously there had been in English but three electives, all given by Child: History of the English Language; Anglo-Saxon; Chaucer, Shakspere, Bacon, Milton, Dryden. In 1879 the three electives have grown to seven. The years 1887–90 saw the founding of two important courses: English 14, dealing with the Drama; English 16, given by Briggs, on the History and Principles of English Versification. Between these two was born the first '20' course in English, devoted to individual research in special topics.

The advent of Kittredge, in 1888, brought new power and new development. Icelandic is introduced, and Germanic Mythology, and Historical English Grammar. Furthermore, the newcomer temporarily relieves Child of the Shakspere course, which eventually is to fall into his hands. Another collaborator was found by Child in Alfred C. Garrett (A.B. 1889), who in 1893

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[1] Maynadier has made several fields his own: *The Wife of Bath's Tale*, *The Arthur of the English Poets*, *The Areopagus of Sidney and Spenser*. He has edited Defoe and Fielding. Webster's main interest has lain in the Middle Ages: *Lancelot and Guinivere*, *The Chief British Poets of the fourteenth and fifteenth Centuries* (with W. A. Neilson).

GEORGE LYMAN KITTREDGE

KUNO FRANCKE

assumed a share in the Chaucer course, and took over the Miltonic part of English 11 (Milton and Bacon). Chaucer was later to be interpreted by Kittredge and by Robinson; Milton, by Neilson. Kittredge's English 21, the Metrical Romances, was another offspring of this eventful 1892–93. At the same time Wendell offered experimentally a course, English 23, on the Works of Shakspere, beside the English 2 of Child and Kittredge.

In the year 1928–29, the English Department offers twenty-three full and sixty half-courses, exclusive of '20's.' Three famous Composition courses, A, 12, and 5, are still extant. Provision is now made for foreign students, for the backward, and for the forward. Among the more comprehensive literary courses we may note the popular History and Development of English Literature in Outline (28), the Historical and Intellectual Background of English Literature (78), both offered by a galaxy of talent; Lake's course on The English Bible; Rollins's on Types of English Literature, Murdock's on American Literature, Lowes's on Contemporary Literature, English and American, Perry's on the History of English Literature from the Elizabethan Times to the Present. Most of the courses, however, deal with some particular author, period, or subject. To carry on this work, fifty-seven teachers are needed, exclusive of unnamed assistants and not counting six men enlisted from other Departments to give the 'background' course, English 78.

With regard to our whole offering, the doubt sometimes arises whether the Division is not attempting too vast a variety of instruction; and that misgiving is perhaps peculiarly pertinent to the rich Department of English.[1]

4. From German to Germanic

The first great figure on the Teuton side is that of the Rev. Dr. Frederick Henry Hedge (1805–90, A.B. 1825), who, after years of service as Professor of Ecclesiastical History, became in 1872 Professor of German. He was a notable personage in the University City, was fecund in addresses, sermons, poems, and wrote a few books well known in their day.[1] At nearly the same time arrived two excellent teachers, G. A. Bartlett and William Cook, the former destined to serve long and win much love, the latter an object of admiration for his keenness, and of terror for his system of marking by means of a mathematical curve.

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[1] Abundant as this offering is in quantity, and heterogeneous in content, it is by no means unusual for an American university. Columbia, in 1925–26, offered forty-six full and thirteen half-courses in English; the University of Utah, in 1928–29, offered fifteen full and thirty-three third-courses in English, including composition courses on The Business Letter, the Short Story, and the One-Act Play. S. E. M.

The 'Old Grad' recalls the names of Oscar Faulhaber, Frederick Lutz (A.B. 1878), Karl Friedrich Richard Hochdörfer, and the versatile and migratory Eugene Howard Babbitt (A.B. 1886). In those pristine days, it was common to utilize in the German Department anyone who had been recently studying any subject in Germany. Thus Emerton, the historian, served his term; Harry B. Hodges, a chemist; E. S. Sheldon and Grandgent, Romance scholars; Benjamin L. Robinson, the botanist.

Meanwhile, in 1884, the German staff got its most illustrious recruit, Kuno Francke, a trained historian, an authority in art as well as in literature, an eloquent speaker and writer both in his native German and in the adopted language which he so perfectly mastered. His Social Forces in German Literature won him renown in 1896; other works have followed from time to time; he has edited that useful series of translations called The German Classics of the Nineteenth and Twentieth Centuries. His greatest achievement of all, however, has been the creation of the Germanic Museum, a thing of beauty and a perpetual joy.[2]

On the linguistic side, the Department acquired corresponding strength in 1889–90 by the enlistment of H. C. G. von Jagemann, a born scientist, offshoot of a distinguished military stock, student at Leipzig and Johns Hopkins, who served his apprenticeship as professor in Indiana University. Both as teacher and as administrator he showed the highest ability. His colleagues and pupils will never cease to admire the serene fortitude with which he bore, in his last twenty years, a crippling and torturing infirmity.

The Department was now well on its feet. In 1890 appeared Max Poll; this genial scholar added to his German interests an excursion into Middle Latin and a study of Dutch. For many years now he has been head of the German Department at the

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[1] *Prose Writers of Germany*, *Martin Luther and Other Essays*, *Hours with German Classics*, *Modern Poetry*.

[2] See Professor Francke's chapter on the Museum, below. His other works include *A History of German Literature*, *German Ideals of To-day*, *Personality in German Literature before Luther*, *German After-War Problems*.

University of Cincinnati. The new year 1893 found at Cambridge Hugo Karl Schilling, subsequently chief of the German Department at Berkeley; Henry L. Coar (A.B. 1893), soon to migrate to Adelphi; and Heinrich C. Bierwirth (A.B. 1884), author of a Practical German Grammar, who has remained with us throughout his teaching career. Raymond Calkins (A.B. 1890), now Minister of the First Church in Cambridge, instructed in 1893-95; his first lessons in the German language had been given him by his father (also a clergyman), according to a highly entertaining and effective etymological method of his own.

Of the present members of the staff, John A. Walz and William G. Howard (A.B. 1891), appeared in 1895-96. Each has since been Chairman. From Walz we have a study of The Foundation Sacrifice and Kindred Rites; from Howard, *Ut Pictura Poesis* and *Laokoön*. Professor Horatio S. White of Cornell (A.B. 1873), was called here in 1902 as Professor of German and Chairman of the Athletic Committee.[1] Intensely interested in Wagner operas, he did much to make them familiar, from the literary side, to his students. He also initiated a course on Bismarck's Speeches and Letters. White retired in 1919. Among later acquisitions are Associate Professor Frederick C. Lieder (editor of Schiller's *Don Carlos*), Assistant Professors Taylor Starck, Frank S. Cawley (A.B. 1910), Arthur Burkhard, Walter Silz (A.B. 1917), Dr. George Maxwell Howe, and Dr. Henry Harmon Stevens. In spite of heavy losses, the Department is, then, fully manned. It has to contend with a peculiar difficulty in the huge resort to German A, the elementary course, which calls for a large staff of competent men, few (if any) of whom can hope for promotion. The World War, by nearly obliterating German from the secondary schools, greatly increased the enrolment in German A, while reducing deplorably the attendance at advanced courses. Little by little, however, the Department is returning to normal conditions.[2]

Aside from the more obvious instruction in the German language and the great German writers and periods, different members of the force have introduced more specialized teaching. In his course on Schiller, Professor Bartlett used to assign each of the plays to a committee of three students, one of whom should investigate the poet's life at the time of composition, while the second should examine the sources and the author's treatment of them, and the third should make a critical study of the piece itself; all three were then to report in full to the class. Inasmuch as the pupils were young undergraduates, this scheme was felt to be a refreshing innovation. Another novelty, of a different character, was Professor Francke's big lecture course on German literature, which required no knowledge of German, all the reading being done in translation.

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[1] White had published an edition of *Lessing's Prose and Letters*, *Selections from Heine's Poems*, and a volume of *Deutsche Volkslieder*. His great work, *Willard Fiske, Life and Correspondence*, came out in 1925.

[2] In 1928-29 the Department offers five full and seven half-courses in the elementary group, two full and thirteen half-courses in the middle group, and one full and ten half-courses in the graduate group, beside '20' courses.

In the extension of the Department's scope beyond modern German, a considerable part was played by men primarily associated with other fields of study. When Germanic Philology, Gothic, and Old High German are introduced, it is Sheldon who presents them. Middle High German is taught by Bartlett and Sheldon. Francke, to be sure, creates a course on the History of German Literature and Art in the Middle Ages; and Poll brings Dutch into the field. But Germanic Mythology and Old Norse are sponsored by Kittredge. Scandinavian studies are continued and enlarged by William Henry Schofield.[1] Anglo-Saxon, first launched by Child, has always remained in charge of the English Department.

We have seen that in 1897 the title of the Department was changed from simple 'German' to 'Germanic Languages and Literatures.' The advent of Professor von Jagemann, with his constantly growing linguistic resources, made the staff more and more independent of extraneous help. At present, the regular force, including as it does Professors Walz, Starck, and Cawley, is quite able to deal with the outlying parts of the domain, even Old Saxon and Old Frisian. The Department indeed deserves the name 'Germanic.'

Gaps in the German shelves of the library have been filled by various donations. The heavier contributions have come from Archibald C. Coolidge (the Hohenzollern Collection), Curt Hugo Reisinger (A.B. 1912), and, most appropriately, from

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[1] In connection with his work may be mentioned the American–Scandinavian Foundation, established in 1911, by the late Niels Paulsen, a wealthy iron merchant of New York, who left half a million dollars to maintain an interchange of students and studies. *The American–Scandinavian Review* is connected with the enterprise. The leaders have been Schofield and his pupil, Henry Goddard Leach.

Ellis Loring Dresel (A.B. 1887), who by his conduct in the difficult post of United States Commissioner to Germany, 1919–21, did much to renew our cultural bonds with the Germanic world.

5. Neo-Latin

The Romance Languages had a considerable start over English and German, and were stricken by no such calamity as afflicted the latter. In fact, the Department at one time suffered from excess of prosperity. It was immediately after the war with Spain, when pupils in preposterous numbers went flocking into elementary Spanish, expecting (but never obtaining) lucrative employment in South America; nearly twenty years were needed to restore a rational balance. As to the World War, it, too, drove students from the higher German to corresponding French and Spanish courses, but in them there has been no troublesome congestion. A feature of the last few years has been a noticeable growth in the resort to Italian, due partly to increase in the number of students of Italian origin, partly to a new interest in the affairs of Italy. Most conspicuous of all, and most encouraging, has been the rising ride of graduate students.

After the inauguration of President Eliot and the return (in 1870–71) of Ferdinand Bôcher as Professor of Modern Languages, the first important event is the appointment of Adrien Jacquinot as Instructor in French, in 1872. He served until his death in 1884, and taught systematically, competently, and entertainingly (as perhaps only a Frenchman can) the literature of the seventeenth, eighteenth, and nineteenth centuries. In 1883 he published a short sketch of Harvard University,[1] which President Eliot pronounced, long afterward, 'the best history of Harvard ever written.'[2]

Next appears on the scene, in 1874, Charles Eliot Norton (1827–1908), Lecturer on the History of the Fine Arts as Connected with Literature. The following year his title is changed to Professor of the History of Art. His participation in the business of Modern Languages did not begin until 1879, when he announced a graduate course on the Interpretation of the Divine Comedy. A fresh start was made in 1890, when Italian 4, his famous course on Dante, was first given. As writer, lecturer, critic of public affairs, he did much to civilize his often ungrateful fellow-countrymen. Perhaps, however, he is most notable for his distinguished and lasting friendships.[1] A large part of his Dante treasure (since enlarged by gift and purchase) was presented to the College in 1884. Our Dante collection is now among the best, though not equal to that of Cornell.

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[1] '*L'Université Harvard*' (Extrait de la *Revue internationale de l'Enseignement*, 1881–82), 104 pp., Paris, 1883.

[2] It is curious to note that Roger Wolcott (A.B. 1870), later Governor of Massachusetts, was Tutor in French and History in 1870–71; James Barr Ames (A.B. 1868), future Dean of the Law School, Tutor in Modern Languages in 1871–72; Joseph Randolph Coolidge, the architect, taught Spanish the year after his graduation (1883).

E. S. Sheldon, who of necessity must often be registered in our narrative, became Instructor in Modern Languages in 1877, Assistant Professor of Romance Philology in 1884. During four years his friend George Bendelari (A.B. 1874), dubbed by a student publication 'The Man of Many Languages,' was with him. Thereafter accessions came thick and fast. The French Department acquired in 1884 a brilliant and energetic coadjutor in Adolphe Cohn, a graduate of the Ecole des Chartes, who wrote little but spoke much and always well. After lending us a helpful hand for some years, he returned (as head of the Department of Romance Languages) to Columbia, whence he had come; he is now living — and editing — in Paris.

The next seven years brought us, in succession, Robert Louis Sanderson, who afterwards became professor at Yale; Charles Hall Grandgent (A.B. 1883), now here; Frédéric César Sumichrast (or Frederick Caesar de Sumichrast, as recorded in the Quinquennial), long Chairman of the Department of French; Philippe Belknap Marcou (A.B. 1876, PH.D. Berlin), who recently died in Paris; Arthur Richmond Marsh (A.B. 1883), Assistant Professor of Comparative Literature, of whom mention will be made farther on; Alphonse Brun, familiar to many a generation of students as an enlivening teacher of composition.

Sumichrast, Sanderson, and Marcou were bilingual. The first, partly of English and partly of French blood, born in Nova Scotia, educated in Switzerland, remained a British subject and on his retirement took up his residence in England. He had a gift for organizing and managing; the same method and the same enterprise he carried into his lectures. As a public reader, too, he had distinct success.[1] Sanderson, the son of a Scotch father and an English mother, born in London, was brought up in France and (thorough Scotchman as he was in looks and character) spoke exquisite French. Marcou, curious and versatile, published, in Berlin *Der historische Infinitiv im Französischen* (1888); in France, several articles on Mexican linguistics and archaeology; in America, a lecture entitled 'Are French Poets Poetical?' His mother was an American, his father a French geologist of some distinction, an associate of Louis Agassiz.

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[1] Aside from numerous letters, essays, and addresses, he wrote or edited *Historical Studies of Church-Building in the Middle Ages*, *Letters of James Russell Lowell*, *The Love Poems of John Donne*, *The Correspondence of Carlyle and Emerson*. With remarkable closeness and elegance he translated into English prose the *Vita Nuova* and the *Divina Commedia*.

Continuing our chronology, we find in the decade 1893–1902 eleven arrivals, of whom only three are still here:[2] Charles H. C. Wright (A.B. 1891), who has made the French classics popular; George L. Lincoln (A.B. 1896), expert in both French and Spanish; Jeremiah D. M. Ford (A.B. 1894), *Doctor Universalis* in Romance.[3] The great library of Count Paul Riant, rich in French and rich in Tasso, was purchased for Harvard in 1899 by the combined efforts of John H. Treat (A.B. 1862) and the Coolidges.

Again, from 1901 to 1909, we find an almost unbroken yearly succession. Murray A. Potter (A.B. 1895), a fine, sympathetic nature, did much for the appreciation of Romance and Comparative Literature until his untimely death in 1915; he published Sohrab and Rustum, a history of the tale of combat between father and son, and Four Essays, containing a notable contribution to the understanding of Petrarch. Among those who left us to accept high positions may be mentioned Ernest H. Wilkins, President of Oberlin College; he is known to scholars by his penetrating investigations in Petrarch, in Dante, in the origins of Italian verse-forms; to teachers, by his little volume of thoughtful and stimulating presidential essays. Arthur F.

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[1] Sumichrast made some translations, edited for school and college a good many texts, and wrote *Americans and the Britons* (1914), *The Making of America* (1919).

[2] Among the others were Curtis H. Page (A.B. 1890), the author and translator; Charles Cestre, later Exchange Professor here, at present professor at the Sorbonne; G. N. Henning (A.B. 1894), now head of the Romance Department and Dean of the Graduate School at George Washington University; Sylvanus G. Morley, scholar, explorer, and poet, now professor at the University of California; Edward Larrabee Adams, now professor at the University of Michigan.

[3] Wright has published *French Classicism*, *A History of the Third French Republic*, *A History of French Literature*, *The Background of Modern French Literature*, *Selections from Montaigne*, *Selections from Rabelais' Gargantua*. Ford's contributions will be enumerated presently.

Whittem (A.B. 1902), Richmond L. Hawkins (A.B. 1903), and George B. Weston (A.B. 1897), book-lover and musician, are fortunately still with us; Hawkins has made a definitive study of Charles Fontaine and a critical comparison of three manuscripts (now in America) of the *Roman de la Rose.* As a discriminating and learned exponent of French literature we have Louis Allard, *Normalien*, who has published the first of his four volumes on *La Comédie de moeurs en France au 19ème siècle.*

Since 1909 the Romance Department has acquired three experts in the practical side of language teaching: Guillermo Rivera, Eugène-Louis Raiche, and Louis-Joseph Mercier. The last especially has stimulated an interest in French social and political matters. For the later literature, we have André Morize, who came (invalided) during the war as Lecturer on Military Tactics and remained as a very popular and efficient teacher of letters, interested particularly in modern writers and their social and industrial background. In 1909–10 Ralph H. Keniston and Chandler R. Post (both A.B. 1904) were in the Romance Department. The former, known for his work on Garcilaso de la Vega, went to Cornell and thence to Chicago. Post, belonging in turn to the Departments of Classics, Modern Languages, and Fine Arts, has finally adhered to the last; his principal study in Romance is his Mediaeval Spanish Allegory.

These are many men; but they have been spread over a wide field. Indeed, they have built up three Departments — French, Italian-Spanish, Romance Philology — afterwards merged into one. And they have contributed to the upbuilding of three more: Germanic Languages and Literatures, Comparative Literature, Comparative Philology. The last two, in fact, are offshoots of Romance Philology.

For a long period the standard courses in French literature were Bôcher's on Molière (French 3), and Jacquinot's on the authors of the seventeenth, eighteenth, and nineteenth centuries (French 4, first offered in 1873–74), in cycles of three years. These courses were given in French, as, indeed, was most of the instruction subsequently organized. After the death of Jacquinot, in 1884, we find special courses devoted to the last four centuries, and a new General Introduction to French Literature (6), given first by Bôcher and Sumichrast, later by Sumichrast alone, then by Grandgent, now by Morize. This fundamental and much-frequented course has to be divided into a number of sections, in some of which only French is used; the study consists mainly in the reading of assigned texts (with frequent reports and tests) and discussion of literary movements. For the writings of periods earlier than the seventeenth century Marcou offered two courses as early as 1890-91. These, however, did not maintain themselves; they lapsed, and later were replaced by the present courses given by Ford and Hawkins. Bôcher dropped out in 1902, Sumichrast in 1911.

Italian and Spanish, once fostered by Ticknor and Longfellow, early in our period came into the hands of Nash. Lowell, Sheldon, Bendelari, Norton, Marsh, Fletcher, Grandgent, Marcou, Ford, Potter, Lincoln, Whittem, Rivera, with younger coadjutors, have carried on the work. The nineteenth, sixteenth, and fourteenth centuries are more or less provided for. In 1885-86 Lowell is giving Dante (Italian 4) and Cervantes (Spanish 4); but this year is his last, and Norton inherits Italian 4. Presently Historical Italian Grammar (Italian 3) is offered by Grandgent; it is later expanded by Sheldon, who gives also a Spanish 3 to match it. The year 1899-1900 witnesses a strange division of the Dante course: it splits into Norton's on the Literature and the Fine Arts in Italy, and Marsh's on the Works of Dante. This separation, however, does not last long. Norton, already emeritus, soon withdraws, and Marsh exchanges Dante for the cotton business. The Dante class (now Italian 10) is left to Grandgent. Italian has until this year lacked a course in composition, whereas Spanish has long had two.

If Sheldon counted for much in the establishment of Germanic linguistics as a subject of study, he counted for everything in the creation of a Department of Romance Philology. This he did single-handed, for many years confronted with indifference that was almost worse than hostility. Bôcher, in his early enthusiasm, had studied not only Old French with such means as were then at his command, but also the comparative method of Diez, and had tried, with more zeal than success, to attract pupils to that field. In 1872-73 we find him offering instruction in Provençal, Old Italian, Old Spanish, and Diez's Grammar. Lowell himself announced Old French in 1874-75 and 1876-77; the next year, Lowell being gone, the course devolved on Bôcher. In the Graduate Department (1874-79) Bôcher offered the Comparative Philology of the Romance Languages; in 1879-80, *Grammaire Historique et Histoire de la*

Langue Française. The case, however, seems hopeless. Yet Sheldon, with fresh courage, contrived presently to introduce into the French list a course in Romance Philology and one in Old French. By 1886 he had obtained a separate announcement of Romance Philology courses — four of them, including one in Provençal, given by Grandgent, a new recruit. In the next years Sheldon added Low Latin, Old French Dialects, and the French Element in English. Portuguese came with Ford, who eventually took over the Old Spanish and Old French, as Grandgent took the Old Italian and the Vulgar Latin.[1] A seminary and a general review of Romance Linguistics round out the group, making amends, in some measure, for the loss of Anglo-Norman and the French Element in English, which Sheldon had made his own. Old French, which is pursued both by students of Romance and by candidates in English, has swollen to almost unwieldly dimensions, forming a really humorous contrast to the earnest two or three specialists of early years. The Department has not yet offered a course in Rumanian.

E. S. Sheldon, who started so many things, lived from 1851 to 1925; he retired in 1921. Thoroughly trained abroad in both Germanic and Romance linguistics, he united scientific curiosity with great practical facility in the acquisition of tongues. A combination still rarer was his blend of adventurousness and judicial temper, of originality and caution. His great work is to be found in the etymologies of Webster's International Dictionary. Early in life he brought out a delightfully compact Short German Grammar. Many articles on language and literature stand to his credit; but his principal publication is his *Concordanza delle opere italiane in prosa e del Canzoniere di Dante Alighieri* (with Alain C. White, A.B. 1902). His Romance work has been carried on by Grandgent and Jeremiah Ford,[2] both his pupils.

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[1] To the extraordinary liberality of John B. Stetson, Jr. (A.B. 1906), moved in the first place by memory of his grandfather, the Count of Santa Eulalia, we owe a superb Portuguese library, impossible to match outside of Portugal; Brazilian matter has been contributed by Edwin Vernon Morgan (A.B. 1890) from the library of Dr. Salvador de Mendonca.

[2] As a Romance scholar, Grandgent is known especially for his *Phonology and Morphology of Old Provençal*, *Introduction to Vulgar Latin*, *From Latin to Italian*, an annotated edition of the *Divina Commedia*, and four volumes of Dante studies. Ford early distinguished himself with his *Old Spanish Sibilants*, and has continued his service to philology with his *Old Spanish Anthology*, *Romances of Chivalry in Italian Verse*, *Old*

6. Fresh Fields

Fully equipped, like Pallas from the head of Zeus, Arthur Richmond Marsh (A.B. 1883), entered the Harvard Faculty in 1891 as Assistant Professor of Comparative Literature. With the new man, a new line of study; not a new department, for Marsh always contended that Comparative Literature is not a subject, but a method. Dividing his time between instruction in Romance Languages and the upbuilding of his little group of courses, he was achieving a solid success, when suddenly, in 1899, he gave up his post to enter the cotton business. By temperament, by breadth of reading and depth of thinking, by power to interest and to convey, he seemed of all men particularly created for a professorship; and (beyond some attempt at amateur agriculture) he had given no token of his impending desertion.

It was a time when the comparative method, already in vogue for linguistic study, was beginning to adapt itself to letters, the name and the fashion being widely diffused by Joseph Texte. Marsh's first ventures in the new style of interpretation were The History of Classical Learning in Europe from the fifth to the fifteenth Century and Comparative European Literature in the Middle Ages. Two more courses appear in the next year's announcement: The Origin and Development of Historical Epic Poetry in Mediaeval Europe and Legendary and Poetic Material of Celtic Origin. The former, of course, treats the subject from the Romantic, pre-Bédier point of view; the other marks the rising of the flood of Celtic sources. Reinforcements presently arrive — Fletcher and Schofield, both then attached to the Department of English. Irving Babbitt, in 1894, had made a modest entrance as Instructor in French. In 1902 he adds to the Comparative Literature programme his very successful exposition of Rousseau and his Influence.

The man who really did create a Department of Comparative Literature was William Henry Schofield (1870–1920, A.M. 1893), appointed in 1897 Instructor in English and subsequently Professor. He mustered a brave array of courses, launched the Harvard Studies in Comparative Literature, and wrote numer-

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Spanish Readings, Main Currents of Spanish Literature; we may soon expect from him a much-needed work on Old French.

ous and important works.[1] Schofield had a genius for tracing literary affiliations.

The Department calls necessarily for wide collaboration. In the incipient stages, Murray Anthony Potter offered a good share. A combination course in Virgil was announced in 1899–1900 by Morgan of the Classics Department and P. B. Marcou. Barrett Wendell, in his later years, made of the comprehensive survey his chief interest; there was one course, especially popular, which the students called 'Seeing Literature.' Bliss Perry, Kittredge, Tatlock, Rand the Classicist, Francis Peabody Magoun (A.B. 1916) are among the many expounders. Magoun, a Mediaevalist whose particular specialty is the story of Alexander the Great, is a coming power in the Department.[2]

Perhaps the most influential member of the corps is Irving Babbitt, who, although his professorship is in French, devotes the greater part of his time to Comparative Literature. A champion of humanism and of sane and virile criticism, an implacable foe to sentimentality and the particular sworn enemy of Jean-Jacques Rousseau, he has a large following not only at Harvard but throughout the academic and literary world.[3]

Slower than Comparative Literature in winning explicit recognition here was Comparative Philology (or, as it might better be called, Comparative Linguistics). Like so many other studies, this subject was introduced to us by Sheldon. An early disciple and admirer of Henry Sweet and Eduard Sievers, Sheldon lost no time in promoting the cause of phonetics. It is not, however, until 1895–96 that we find established a course called Philology 2, a General Introduction to Linguistic Science, offered by Sheldon and the Germanic scholar, von Jagemann. Later Sheldon's half was taken over by Grandgent, who had received in Leipzig some instruction in the anatomical aspect of speech and who invented some methods of investigation recorded in his Vowel Measurements and his German and English Sounds. Von Jagemann continued the other half on the Prin-

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[1] To name only a few, *Chaucer's Franklin's Tale*, *The Lays of Graelent and Lanval*, *Signy's Lament*, *The Lay of Guingamor; English Literature from the Norman Conquest to Chaucer; Symbolism, Allegory, and Autobiography in the Pearl; Chivalry in English Literature.*

[2] He has recently brought out a volume called *The Gests of King Alexander of Macedon.*

[3] His books illustrate his principles: *Literature and the American College*, *The New Laokoön*, *The Masters of Modern French Criticism*, *Rousseau and Romanticism*, *Democracy and Leadership*, *Criticism in America.*

IRVING BABBITT

BLISS PERRY

JEREMIAH D. M. FORD

ciples of Linguistic Change as long as his health permitted. This course was a part of a plan to group together all the scattered contributions of the different departments to the pursuit of General Linguistics. At last, two years ago, Professor Joshua Whatmough, an English comparative philologist primarily concerned with the Italic dialects, was called from the University of Cairo to organize a real department. An excellent beginning has been made; Sheldon's dream has come true.

It is evident that Comparative Literature and Comparative Philology lie only in part within the domain of Modern Languages. On the other hand, two other recent arrivals, Celtic and Slavic, while outside our several departments, may be regarded as regular members of our Division. Each of the two has been introduced, and is still maintained, by a single man.

Celtic gets a place on the programme in 1896-97, when Fred Norris Robinson, a young teacher in the English Department, announces courses in that subject — an offering which has been kept up with little change until now. Students, though not numerous, are apt to be of the inquiring sort. The principal incentive to this recondite study is an eager desire to determine the relations between old Celtic story and French and English mediaeval fiction. In anticipation of Professor Robinson's great Chaucerian work, we may see some results of his bifurcated industry in his Irish Lives of Guy of Warwick and Bevis of Hampton and his Human Sacrifice among the Ancient Celts.

The Russians were not behind the Irish. It was in 1896 that Leo Wiener, half Slav and half German, a non-academic scholar of arresting mental alertness and amazing aptitude for languages, received an appointment here to teach Russian and the kindred tongues. At the same time, A. C. Coolidge began his long series of generous gifts to the Library of works on Russian literature. Wiener started with two and a half courses on Russian, Polish, and Old Church Slavic; to these he later added Bohemian, Slavic Philology, and two popular courses on Russian literature in translation. His own polyglot and iconoclastic activity has roamed far beyond the confines of Slavic, carrying light and havoc into realms so remote as to generate faith in almost impregnable security.[1]

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[1] The principal titles on the Russian side are: *Anthology of Russian Literature*; *Tolstoy's Complete Works*, translated and edited; *An Interpretation of the Russian People*; *The Contemporary Drama of Russia* (which really goes back to the origins). For Yiddish:

7. AUXILIARIES

Even before we hit upon the idea of periods of independent study, there were certain voluntary and extra-curricular ways of helping on one's education. There were, for instance, public lectures and plays. Away back in President Hill's administration there was a notable institution known as the University Lectures, some of which were on the modern literatures and were given by eminent men such as William Dwight Whitney and William Dean Howells.[1]

A dark season apparently intervened. Came another dawn in 1884–85, with readings by Bôcher, Cohn, and Briggs. And Henry Irving (not yet 'Sir') gave a lecture. In the ensuing year members of several departments held discourse in their several languages — among them Bôcher, Child, Briggs. The year after was preëminently German; Kuno Francke, recently arrived, gave three lectures in that language on contemporary drama, also one on Bismarck (in refutation of a philippic by Adolphe Cohn on the same subject) under the auspices of the new-born student organization called the Deutscher Verein. From this time on the stream flows constantly, though a bit unevenly. Symptomatic of a growing taste are discourses by Charles Sprague Smith on the Icelandic saga, by A. R. Marsh on the Middle Ages, by Kittredge on the early English Gawain romances. By 1892 Copeland appears on the scene, perhaps the most successful of our platform artists. Charles Eliot Norton introduces Dante. Already in 1895–96 an undergraduate club destined to play a conspicuous rôle, the Cercle Français, was taking a hand in the presentation of speakers.

Did students flock to these lectures? Audiences there were, to be sure; but they were composed mainly of Boston and Cambridge ladies, many of whom, having acquired the lecture habit, could be counted upon to fill a respectable number of seats. A French lecturer (regardless of his subject) would always draw the faithful who wanted to 'hear French' — not to speak of the

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Morris Rosenfeld, *Songs from the Ghetto*, with translation, glossary, and introduction; *The History of Yiddish Literature in the Nineteenth Century*. Specimens of his investigations in the history of culture and of language are *Commentary to the Germanic Laws and Mediaeval Documents*, *Contributions toward a History of Arabico-Gothic Culture*, *Africa and the Discovery of America* (three volumes of evidence and argument for a pre-Columbian contact of America and Africa).

[1] See Professor Haskins's chapter on the Graduate School.

knowing Bostonians whose principal concern was to criticize his French accent. Students would occasionally disturb their leisure to see a speaker whose renown was sufficiently strident to have penetrated even studentdom. Otherwise they rather prided themselves on their intellectual indifference, a pose which more or less persisted until the World War. One exception they made, however, and it was an important one — Copeland, whose annual courses of talks and readings for several decades provided a *liaison* between the adolescent mind and the treasured wisdom of the ages.

A new lecture-springtime came in 1896, when, under the auspices of the French Department, the great critic Brunetière gave three lectures on Molière; and, as a background, five members of the University discoursed on five different subjects connected with France. The banner year, though, was 1897–98. Then Copeland gave his course on the English novelists and other writers. There were four lectures by Bôcher, Cohn, George McLean Harper of Princeton, and Alphonse van Daell of the Massachusetts Institute of Technology, besides a course of eight by members of the Department. There were three performances of Racine's *Athalie*. And, under the patronage of the now prosperous Cercle Français, eight lectures by René Doumic, the dramatic critic, on the history of French Romanticism.

A fateful enterprise was this of the Cercle, undertaken at the instigation of one of its members, James Hazen Hyde (A.B. 1898), and continued, no doubt, very largely at his expense. For many years it brought to our shores a succession of distinguished Frenchmen; and it led ultimately to the official establishment of an exchange professorship with France. The Cercle introduced, among others, Henri de Régnier, the poet, who opened to us an inside view of the Symbolist School; Anatole Le Braz, who told of Brittany in French literature; André Tardieu, since become so prominent in French public affairs, a clever, incisive speaker; Joseph Bédier, leading mediaevalist, now one of the forty Immortals. The subjects were fairly divided between politics and letters. Barrett Wendell's return visit to the Sorbonne in 1904–05 was an event of first importance in the cultural relations of the two nations.[1]

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[1] *The France of To-day* was the outcome of this visit, and the *Salle Barrett-Wendell* at the Sorbonne an indication of his hosts' appreciation. See M. A. DeWolfe Howe, *Barrett Wendell* (1924).

It must not be supposed that the French monopolized the lecture platform and the stage. In 1899–1900 the German Department afforded a beautiful performance of Goethe's *Iphigenie. Minna von Barnhelm*, *Die Geschwister*, *Die Jungfrau von Orleans* also were in their store. Professor W. H. Carpenter, of Columbia, in the ensuing year gave three lectures on fundamental aspects of Germanic studies. A year later, Camillo von Klenze (A.B. 1886), then professor at Brown, offered a series of discourses on the evolution of the Nature-Sense and on Goethe's attitude toward antiquity.

The first foreign exchange professorship was not with France but with Germany, and was arranged by Kuno Francke. He was in Berlin in the spring of 1902, at the time of Prince Henry's visit to Harvard. German-American enthusiasm was in the air, and Francke was somewhat startled at the eagerness of the Prussian Ministry of Education to send German professors to America. Knowing President Eliot's approval of the exchange idea, as evidenced by Professor Beale's visit to Chicago, Francke managed to turn what had been conceived as a royal bounty into a mutually beneficial interchange between the two countries. It was inaugurated in 1905–06 with the visit of the Rev. Francis G. Peabody to Berlin, and of Dr. Wilhelm Ostwald of Leipzig to Harvard. Subsequent years brought us Eugen Kühnemann who spoke on German literature (twice); Paul Clemen, on German art; and Rudolph Eucken, on philosophy. This exchange was cut short by the war, but partially resumed in 1927 in the person of Adolph Goldschmidt, who lectured on the fine arts and German culture.

Even the vernacular was not neglected. Copeland's readings went on. Sidney Lee, in 1902–03, spoke of national biography and of foreign influences on Shakspere. Single lectures, of course, abound — Constant Coquelin, for instance, Henry James, and John Fiske. Jean Beck has given two series of lectures (illustrated by instrument and voice) on mediaeval lyric and dramatic music. Best remembered, no doubt, are Kittredge's illuminating discourses on Shakspere.

For the last fifteen years there has been an exchange of professors between Harvard and the French universities. During the war years Harvard extended hospitality to a number of eminent scholars from the University of Louvain. Of these Maurice de Wulf, scholastic philosopher, remained with us until 1926, and George Sarton, historian of science and editor of *Isis*, is still with us.

On the regular French exchange list we find four extraordinarily effective professors of English,[1] one professor of German — Henri Lichtenberger, five professors of French and Comparative Literature.[2] Most of these exchange professors have taken charge of a course or two and have given public lectures as well.

Not to be forgotten is the assistance we have lately received from England. In 1925, Oliver Elton, retiring from his chair at home, acted as professor here, giving regular courses on English Literature from 1730 to 1745, and Poetics and Literary Criticism. Gilbert Murray, in 1926–27, delivered a notable series of public lectures as first incumbent of the Norton Professorship of Poetry.

The platform has been supported by the stage. Aside from the regular theatres, our students have had various opportunity to hear masterpieces of the drama. The Ancients began the practice. Several of Shakspere's plays were performed, without scenery, in the Sever Quadrangle by the Ben Greet Company. Jonson's Epicœne or the Silent Woman (which Samuel Pepys thought the best comedy ever written) was performed in Sanders Theatre by students, with a close reproduction of the original conditions — even to the orange-girls. Much later, Forbes Robertson and his wife gave Hamlet, in the same place, with virtually no special setting. With the same simplicity Barrett Wendell's Raleigh was acted on the same stage, the author taking the title rôle and Baker speaking the prologue.[3]

In 1897–98 the French Department ventured upon the aforementioned three spectacular performances of Racine's *Athalie*, with Mendelssohn's music and impressive choruses. This, too, was in Sanders Theatre; the actors were all amateurs — among them Sumichrast, Wright, and La Meslée. For the German Department the great theatrical year was 1899–1900, when on the same academic stage the Conried Company of New York performed the pieces of Goethe and Lessing already named. Ten years later — on the evening of June 22, 1909, in the Stadium — the Maude Adams Company did Schiller's Maid of Orleans.[1]

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[1] E. Legouis of Paris, C. Cestre of Bordeaux (now of Paris), A. Feuillerat of Rennes, A. Koszul of Strasbourg (who gave also a course on French blank verse).

[2] Henri Guy (then Dean of the Faculty of Arts of Toulouse), Edmond Estève of Nancy, Paul Hazard of the Collège de France, Alfred Jeanroy, and Fernand Baldensperger of Paris.

[3] For study of things of the stage, Harvard College now possesses 'the largest and most important theatrical collection in the world' (so its Custodian describes it). The great donation by Robert Gould Shaw (A.B. 1869) was made in 1915. Already the Library had the beginnings of a theatrical department, from the generosity of several donors, notably the late John Drew. A couple of years after the Shaw gift came the bequest of Evert Jansen Wendell (S.B. 1907). Two immense collections rolled into one — prints, photographs, letters, playbills, relics, drawings, pamphlets, books — make an aggregate that would be absolutely bewildering, were it not so skilfully sorted and kept.

8. The Product

We have seen the subject of English grow from a humble handmaid of homiletics to one of the greatest departments — perhaps the very greatest — administered by the Faculty of Arts and Sciences. We have watched the modern foreign tongues, whose value was recognized before our era began but whose place in the scheme of things was not determined, gradually adjusting themselves to the rapidly increasing variety of matters to study. This last process is not yet complete. The position of Modern Languages is advantageous enough, as compared with the other leading Departments (perhaps a bit too advantageous in relation to the Classical); but the question of the utility of living foreign tongues as tools is still under debate. Now let us consider the style of scholarship which the development of modern language discipline has produced.

The Undergraduate, if he has selected a modern language as his special field (and nowadays every undergraduate must have some specialty), has to follow at least six courses belonging to that department; and not more than two of these courses may be distinctly elementary. After the Freshman year, his work is done under the supervision and with the advice and help of a tutor. While a Senior, he has to give proof of a general mastery of his chosen subject, and also evidence of familiarity with some of the world's great writings outside his particular field. To this end he must pass three written examinations of considerable extent: one, on the history of the literature he has been studying; the other two, on the Bible, Shakspere, and a couple of ancient authors. These last are to be selected by him from the following list: Homer, Plato, Aristotle, Cicero, Horace, Virgil; and his acquaintance with them may, if he likes, be made through translations. Latin he must have studied, however, if he be a candidate for the A.B.; and French and German.

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[1] The students have done a good bit in the theatrical way themselves. There is a society which presents from year to year old English plays. Another gives German pieces. Another, French, with a preference for Molière. Similar clubs occasionally perform comedies in Italian and Spanish. Further mention of these enterprises must be postponed to a later volume.

Should he be a candidate for Honors, the six courses become eight, though not necessarily all within the limits of one department. His general examinations must be passed with credit, and he must submit a satisfactory thesis on some approved subject. An additional requirement is, in the case of candidates for High or Highest Honors in English or German, an oral examination; for candidates in Romance Languages, a written test on selected topics in literature.

The Graduate, if he possesses the Harvard A.B. or its equivalent from some other college, and seeks only the degree of A.M., can win that distinction by one year's coherent advanced study, pursued with credit.

For the doctorate, two postgraduate years are required, and at least three are generally needed, though only one need be spent in residence. The aspirant must present a thesis that constitutes an original and important contribution to knowledge; and, after acceptance of that document, he must undergo an oral examination of three hours, covering his field of study. Ability to read Latin, French, and German is a requisite. Students of Romance must have acquaintance with all the principal Neo-Latin tongues, at their various historical stages, and an intimate knowledge of French and one other, from the linguistic and from the literary point of view. Candidates in Germanic Languages and in English are expected to show proof of training in Germanic comparative and historical linguistics and to have some smattering of Indo-European. The degree in English calls for a modicum of Old French, as well as Gothic. The Comparative Literature demand may be briefly stated as 'three literatures and two languages' — the language requirement comprehending here (as in the other departments) both practical and historical familiarity.

An examination of the titles of doctoral dissertations will afford some clue to the various interests awakened. Of course, English far outstrips the other Departments in the number of its followers. The first doctor in English, as we have seen, was Robert Grant in 1876; but for the second and third we have to wait twelve years. 1897 has four, 1898 five, and 1900 six; and so it goes on, with irregular increase. A typical recent year, 1926, has thirteen.

As we run over the list, we observe a certain diminution of concern with the Middle Ages and with pure linguistics, counterbalanced by a heightening of interest in the eighteenth century, in criticism, in biography, and in literary types. Unmitigated source-hunting has lost its vogue — if it ever really had one. Are we to infer that linguistics and matters mediaeval have run dry, as dissertational springs? Or have we to do with an automatic reaction, the desire of one generation to be different from the generation before? Or is the principal factor in the alteration an enlargement of the teaching staff, bringing with it new points of view?

If we catalogue the twenty-one English theses accepted in the years 1876–99, we note six or seven linguistic topics, and eleven subjects (more than half) drawn from the Middle Ages. Examples of the two types are: 1890, Observations on the Language of the Cambridge Manuscript of Chaucer's Legend of Good Women, by John M. Manly, now Professor of English in the University of Chicago; 1898, The Origins and Sources of the Court of Love: a Study in Mediaeval Allegory, by the President of Smith College. Now compare the foregoing list with the roll of theses approved in the year 1926, and a startling change will be manifest. In this latter year we have thirteen documents, of which only two are mediaeval, and not one is linguistic; more than half deal with the eighteenth and nineteenth centuries. Specimens are: A. R. Thompson, A Study of Melodrama as a Dramatic Genre; E. M. Wright, Oliver Goldsmith: a Study in the Theory of 'Delightful Teaching.'

In the series of years 1916–26, eighty-six students of English took the Doctorate; and of the eighty-six dissertations fourteen are mediaeval, three are linguistic. The 1926 crop, then, is representative (in this respect) of the whole decade. Attempting a classification of this latest decennial harvest, we are first struck by the abundance of biography; William Godwin leads the procession, followed by ten others. 'Influences' do not bulk large, although several good examples may be found. Commoner is the analysis of one aspect of a literary personage, such as The Religious Element in the Life and Character of William Cowper. In close competition with biography is criticism — critical theory, critical practice; for example, Doctor

Johnson as a Literary Critic, and five more. The courage to treat broad subjects makes itself manifest; of the seven specimens of this type, let us cite: English Pageantry, Solitude as a Phase of the English Romantic Movement. Timidity, however, or the brevity of human existence, may restrict a big theme to chronological confines which give some titles a curiously German look: thus, The Scientific Spirit in the English Novel from 1850 to 1900; Personification in the Chief English Poets, 1725–1824.

Even American literature begins to put in an appearance. In the half-century from 1876 to 1926 four theses deal with our continent: A History of English Canadian Literature to the Confederation; The American Lyceum; The Ballads and Songs of West Virginia; The Life and Works of Increase Mather.

In Germanic Languages and Literatures there are thirty-nine theses in all, from 1880 to 1925. Seven of them are of a linguistic character, such as The Language of the Ormulum and its Relations with Old English. The rest are so varied in type and so few in number that they defy classification. Here are some representative titles: Friedrich Hebbel's Storm and Stress; The Development of the Transposed Order in Old High German; George Eliot and Germany; Heinrich von Kleist's Conception of the Tragic.

In Romance Languages and Literatures, the period 1876–1926 brought forth seventy-three dissertations, twenty-two of them linguistic and thirty-seven mediaeval. This is a much larger proportion than that which we found in English; most of the mediaeval and linguistic theses, however, were written before 1914. The name of L. H. Buckingham, in 1876, leads all the rest; and the lead is a long one, for we have to look to 1894 for the second. Buckingham's thesis has a title whose form smacks of an earlier generation: That the Romance Languages, in deriving from Latin, followed Tendencies to Change which the Latin already exhibited, is illustrated by the Study of Romance Verbal Formation. James Geddes, Jr. (A.B. 1880), the second doctor, now head of the Romance Department at Boston University, offered a Study of an Acadian Dialect. Kenneth McKenzie (A.B. 1891), the third, now professor at Princeton, in 1895 treated The Development of Italian Lyric Poetry before the Rise of the *dolce stil nuovo*.

From the subsequent years we may cull these titles: Spanish

Influence on Molière; The Poetry of Giacomo da Lentino, a Critical Edition; Boileau in England; The Relations of Poetry to Industry under Louis Philippe and Napoleon III. Of the whole output of seventy-three, ten deal with matters of Comparative Literature, four with general Romance linguistics, thirteen with Italian, eighteen with Spanish, two with Provençal, and twenty-six with French.

Under the official head of Comparative Literature we find altogether twelve dissertations, running from 1904 to 1928. The following may serve as samples: The Supernatural in Tragedy; The Relation of Giacomo Leopardi to Classical Antiquity; The Development of Plot and Characterization in Early Greek and Early Elizabethan Tragedy. It is evident, however, from the foregoing paragraphs, that some of the offerings in the Departments of English and Romance might with perfect appropriateness have been labelled 'Comparative Literature.' Candidates are inclined to think that a degree in a more specific field is a better asset, professionally, than a doctorate in a department which as yet is unrepresented in most of our colleges.

Does a doctor, once having proved his ability to do original work, rest forevermore on that assurance, or does he attempt it again? And, if he does try, does he achieve anything of moment? There are doctors and doctors. Some, getting a berth in a slow-going craft, never again feel impelled to assume the arduous (and perhaps always distasteful) task of exploration. Others, serving under an up-to-date skipper, who believes in advertising, are by law compelled to publish something over their names once in so often; their productions, however, seldom startle the world. Others still have the creative impulse and continue in after-life the activity that brought them success in the Graduate School, either following out the vein there discovered or branching into lines quite remote. Which type of scholar makes the best teacher cannot be told *a priori*. One would instinctively vote for the last type; but in so doing one would often enough vote wrong. Much depends on the kind of teaching the teacher is expected to do. Many a man and many a job thrive better with improved competence to impart knowledge than with ambitious endeavor to extend it. Professor Arlo Bates, novelist and scholar, head of the English Department at the Massachusetts Institute of Technology, actually regarded the Ph.D. as a disqualification and never would employ a candidate who had that title. At the other extreme stand those authorities for whom the degree is a *sine qua non*. Some of these apparently do not care in what field the doctorate is achieved, if only the coveted letters tail the name.

Harvard has never made a fetich of the degree. Of the actual permanent staff in Modern Languages, twenty-one members are Doctors of Philosophy and twenty-eight are not. Two are not even Bachelors; and one of these two is among our most brilliant and original scholars. Nor does the proportion vary much as one goes forward or backward in time. On the other hand, the German, with ten doctors out of twelve permanent teachers, does stand out in sharp distinction from the other departments. As to the younger men, comparative figures signify little or nothing, because so many of them are now candidates for the doctorate.

A considerable stimulus to productivity is furnished by the Modern Language Conference, a very informal and very inexpensive club of graduate students, who at stated intervals through the year hold meetings at which papers are read and discussion often ensues. Some of these papers are by the students themselves, some by professors or guests.

To compute the exact proportion of doctors who retain the productive habit would require not only an appalling course of labor but also a supply of data not completely available. Let us attempt a rough estimate. In the fifty years 1876–1926 the Ph.D. was won by three hundred and three candidates in Modern Languages. Of these, some sixty-three have published, since graduation, works of substantial repute, other than their theses. It must be remembered, however, that the largest classes are the most recent, and that the majority of the doctors in question have therefore had comparatively little time for authorship.

9. Conclusion

How can it all be summed up? Expansion, diversification, an attempt to embrace (within the Modern Language fold) all that is knowable; yet, it would appear, no resulting thinness — rather an increase in specific gravity.

From a mere half-dozen in the first year of Eliot's presidency the staff has swelled beyond a hundred. To be sure, the half-dozen contained Child and Lowell, and was presently to add

Bôcher; growth had good guidance from the start. The present force is bigger and presumably busier, but who shall say it is better?

English, in those early years, was a solid, obligatory dose of practical discipline; but already students were afforded an insight into the progress of the language, and already the University Lectures by Whitney and Bôcher and Howells were opening casements upon the fairy fields of literature. Italian and Spanish beckoned to the venturesome. French and German, much buffeted about, prescribed here, elective there, always found a decent place somewhere in the plan.

Now the experimental stage is over — or, at least, so it seems to us. Provision appears to be made for the satisfaction of every conceivable curiosity. Specialists in scores minister to special needs. Has anything been lost? For a while — for several decades, perhaps — it did look as if freedom and wealth of opportunity had impaired in our undergraduates the sense of obligation. If so, that sense has been restored (it surely has been strengthened) by putting upon them the burden of responsibility. The gulf between graduate and undergraduate is disappearing.

Weakest is the 'practical' side of our instruction. We are more successful in leading our disciples through the paths of letters than in teaching them to write and speak correctly. This is true both of the mother tongue and of foreign languages. In English, indeed, the effort has vastly diminished; whether the result has correspondingly declined, we cannot surely say, not knowing how students as a whole spoke and wrote in 1869–70. We fear that now they write rather poorly and speak worse. The same thing can be said of foreign tongues. A satisfactory mode of teaching these arts to college students yet awaits discovery.

Indifference to the intrinsic interest of language (humanity's greatest invention) is manifest, at a later stage, in the dwindling return of theses on linguistic subjects and the still smaller number of subsequent publications in that domain. Our candidates for the doctorate are compelled to do a considerable amount of work in scientific linguistics, and in general do it well — much more understandingly than they did some years ago; yet they seldom develop a chronic affection for that kind of study.

Both the dissertations and the maturer writings show a wholesome keenness and diversity of appetite for research in letters. At present, biography and criticism seem rather in the ascendent. Noteworthy is the gradual swing away from the older and toward the newer literature. It looks almost like a continuation of the secular movement of migration from the classics. First the Ancients were the attraction, then the Middle Ages, now the Moderns. Will the march proceed into Futurism? No symptom betrays such a tendency. On general principles, retrogression is more likely than ultraism. Perhaps, after all, the thesis-writers, like a swarm of locusts, move from one field to another, not from any abstract preference, but in search of fresh pastures to devour. And it may well be that the first researchers, in their avidity, shall leave behind them a sufficiency for the gleaners who shall come after.

IV. MUSIC

1862–1929

By Walter R. Spalding, A.M.
Professor of Music

1. Introduction

MUSIC has flourished remarkably in Harvard University during the last half-century. The fact is evident; its significance even yet not fully appreciated. For this development has taken place in a locality where for generations any secular expression of emotion was looked at askance, and among a people who, since the Reformation, have generally regarded music as effeminate.[1] As President Eliot once remarked, music was 'not especially congenial to the evolved or opened-out Puritans who for a hundred years have had the management of Harvard College.' Puritans aside, the fine arts usually flower in a long-established civilization. When we consider that music among continental nations is reckoned in centuries, and that art among them rests upon age-long traditions, the wonder is not that with us music is still in its youth, but that so much of permanent value has been accomplished.

Music at Harvard has been closely involved with great personalities such as Eliot and Paine, and has been encouraged and sustained by many of the most eminent scholars who have taught in the University. Up to comparatively recent times music was like a vigorous seedling upon which a stone had been placed. But human emotion cannot be eternally crushed. Music, being founded upon emotion [2] and designed to communicate emotion, will live as long as men have emotions. The stone has now been split, and Music, tested by repression, is growing into a sturdy tree of many branches and of wide-spreading beneficence.

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[1] As a fact music is the most vital, the least artificial of all the arts. It would be reckless indeed to assert that Palestrina, Bach, Handel, Beethoven, Haydn, and Brahms were not charged with vitality; or men of exceeding power.

[2] 'La musique doit faire vibrer le cœur.' — Vincent d'Indy.
'From the heart it has come, to the heart it shall go.' — Beethoven.

During the first one hundred and seventy years of Harvard history, music existed in the college purely as an aspect of religion, and religion of a type that laid less stress on music than perhaps any cult in history. President Dunster composed the rude staves of the Bay Psalm Book, printed under his supervision at the Cambridge Press in 1650; and students sang them to traditional psalm-tunes brought over from England. Other metrical versions of the psalms, with newer tunes, an organ, and the singing of hymns, were brought into the College chapel in the eighteenth century. During the generation preceding the Revolution, anthems with both words and music by members of the College were performed on great occasions. By 1814 there was a student choir, for many years trained by William Havard Eliot (A.B. 1815), and including, in that day of adolescent Freshmen, a few good soprano voices.[1]

Although as far back as 1818 pianoforte playing was doubtless one of those 'polite accomplishments approved by the authority of the College,' which the catalogue announced that students might pursue with outside teachers; and although the students organized their own orchestra, the Pierian Sodality, as early as 1808, Music crept into the official curriculum by the religious route.[2]

In the catalogue for 1856-57, there appears for the first time the following announcement:

VOCAL MUSIC

> Instruction in Music, with special reference to the devotional services in the Chapel, is open to all Undergraduates.
>
> The course will extend to the higher branches of part-singing.
>
> Separate classes for graduates will be formed if desired.

Levi Parsons Homer appears in the previous catalogue as '*Instructor in Music*, Boston'; the following year he moved out to Divinity Hall, for several years trained the College Choir, and gave 'extra classes' in Music for Juniors and Seniors. He received a vote of thanks from the Faculty in 1856 'for the zeal and success with which he has devoted himself to the instruction of the students in Music.' John Knowles Paine replaced him as chapel organist, choirmaster, and Instructor in Music, in 1862. The next year he offered two courses of University Lectures on Music. The University Glee Club was founded in 1858. Thus, at the end of the Civil War, we find already established the four distinct and characteristic aspects of music at Harvard: the devotional, curricular, instrumental, and vocal.

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[1] General Henry K. Oliver (A.B. 1818), in *Harvard Register*, i (1880), 76.

[2] We should remember, however, that in 1832 members of the Pierian Orchestra asked President Quincy to establish a professorship in Music. Although he favored the proposal it was vetoed by the Corporation on account of expense.

2. The Chapel Choir

Of these, the parent demands first attention. When Paine became organist and choirmaster in 1862, the music at compulsory morning prayers was led by an informal group of students, and the organ was a very inadequate instrument. Paine, though a gifted organist — a recognized virtuoso, in fact, in Bach's organ works — had little of the patience and practical experience which are necessary for a successful choirmaster. As his time and strength became fully occupied with the new Department of Music, it was decided to try the experiment of a choir of boys and men trained by a professional musician. For this duty Warren Andrew Locke (A.B. 1869), who had studied in Europe and later became organist of St. Paul's Church, Boston, was chosen.

Mr. Locke entered upon his duties in 1882, and began organizing a college choir. A considerable supply of boys' voices was available in the Cambridge schools. In 1886, when morning prayers became voluntary, special efforts were made to improve the music in order to attract worshippers from the student body. In this, Mr. Locke had the enthusiastic coöperation of Phillips Brooks and of his classmate, the Rev. Francis G. Peabody,[1] who that year was appointed Plummer Professor of Christian Morals and later became Chairman of the Board of Preachers. By 1889 the College Choir had become a representative chorus of boys and men.

Mr. Locke continued in charge until 1910, when a change of the Sunday chapel service from the evening to the morning interfered with his duties as organist at St. Paul's. The esteem and affection which Mr. Locke inspired during his twenty-eight years of service, is well expressed on the tablet which, after his death in 1920, his classmates placed in Appleton Chapel:

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[1] For significant comments on this whole development see Professor Peabody's chapter on Voluntary Religion, in this volume.

TO THE MEMORY OF

WARREN ANDREW LOCKE

ORGANIST AND CHOIR MASTER

1882–1910

The inspiring devoted and beloved master and teacher who for
twenty-eight years directed the music in the University Chapel
This tablet records the appreciation of his classmates of 1869

After an interregnum of five months during which the writer was organist *pro tempore*, Dr. Archibald T. Davison (A.B. 1906) was appointed organist and choirmaster. The boy choir was abandoned in favor of a chorus of men composed of the students themselves. There had been this trend for several years by reason of the scarcity of good boy voices, and certain criticism of the type of music presented. The works of Italian, German, and English composers of the fifteenth, sixteenth, and seventeenth centuries, for their note of spiritual contemplation and exaltation, have always been considered by expert musicians to represent the golden age of church music. Dr. Davison, therefore, has trained his choir to sing the best examples, so far as they can be arranged for men's voices, of Palestrina, Vittoria, Allegri, Byrd, Bach, and Handel. The anthems are sung *a cappella*, the organ being used in the prelude and postlude and to lead the singing of the congregation. This procedure has effected a more religious tone in the music, a tone felt and appreciated, though difficult to formulate. Organ and voices together — the organ with its tempered scale and the voices with the natural intervals — never achieve that spiritual purity noticeable in voices singing by themselves.

In 1895 Mr. Locke compiled a University Hymnal which remained in use until 1926. In that year, through the collaboration of Professor E. C. Moore, Dr. Davison, and Mr. Woodworth, a new collection of hymns and tunes was published. This is now the official hymnal of the Chapel. In 1910 the chapel organ was rebuilt, through the generosity of Edward S. Dodge (A.B. 1873), some of the good stops of the old instrument being incorporated in the new.

It is as difficult to make a fair and final statement about church music as about matters concerning dogma or creed. In religion, politics, or art people feel deeply and at times violently, and there are always advocates for special types of music, standards of rendition, and forms of chorus. In church music the norm has always been the mixed chorus with sopranos, altos, tenors, and basses. This is a natural and historical fact not to be gainsaid. All things considered, however, conditions being as they are, the Chapel Choir at this epoch is a good men's chorus and gratitude is hereby given to the choirmaster and to the singers themselves for their devotion and skill.

3. The Department of Music

The Department of Music at Harvard was not founded like a factory or a department store; it grew from a favorable soil, and was always strongly influenced by peculiar local conditions and by the personality and ideals of those who directed it. From the outset its simple and all-sufficing platform has been 'music as an art and a human language,' that is, as a means of communication between composer and listener for itself alone. Or, officially stated, music at Harvard as taught, studied, and estimated, is on a 'perfect parity with any other subject offered by the College.'

Music, to be sure, is a many-sided art, involving such varied factors as the music itself in its grammar, structure, and content, the composer, comprising biography and history, the instruments, and lastly the performer; for music is meant by its creators to be performed and heard. The question has often been asked why Harvard has not included in its musical curriculum the teaching of playing and singing, and at times great pressure has been applied to the Department to change its policy in this respect. This question, however, has been settled by the advantages of the locality. There have always been in Boston and Cambridge so many teachers of singing and of every instrument — the New England Conservatory being specially important — that Harvard has been able to devote itself exclusively to the creative and artistic aspects of music without being under indictment for neglecting the executive side.

As any organization is molded by the foresight, courage, and ideals of those who fostered its growth, we may state with deep gratitude that music at Harvard could never have attained its present position had it not been for the artistic vision and courage of John Knowles Paine and for the intelligent and generous support of Presidents Eliot and Lowell.

It must not be supposed that this growth took place without opposition. Many of the public regarded music as a frivolous subject, unworthy of a place in a university curriculum; and others begrudged the cost. Even so great a man as Francis Parkman, an artist in his own sphere, is said to have been fond of exclaiming in Corporation meetings, after reading the annual budget, '*Musica delenda est!*'

Before describing the organization and aims of the Department, a short biography of John Knowles Paine must be given. He was of typical New England stock. His early life and that of his forbears was spent in one of the grimmest and most barren parts of New England, among 'down-east Yankees' proverbial for their hardheaded shrewdness and unemotional outlook upon life. History, however, shows that musical emotion always exists; that it can never be obliterated; and that when it appears in apparently uncongenial surroundings, the essence, just by reason of repression, is likely to be all the stronger. Joseph Paine, the descendant of an English emigrant to Cape Cod, moved in 1780 from Eastham to Standish, Maine. His son, John K. H. Paine (1787–1835), the grandfather of the composer, had unusual mechanical genius and was passionately fond of music. Hearing that the organ was the king of instruments, he built on the shores of Watchic Pond the first organ in Maine. It was succeeded by another which could be heard, it is reported, for two miles — neighbors enjoying the massive music through the forests surrounding the lake. Of his six children the two most talented were David, for fifty years a noted organist in Portland and Boston, and Jacob, born in 1810. He married in 1833 Rebecca Downs, and of their five children the third was John Knowles Paine, born in Portland, January 9, 1839, in a house still standing. As a boy he showed such marked precocity in music that in 1858, after preparatory work with Hermann Kotzschmar, he was sent to Germany for advanced study. On his return to America in 1861, Paine naturally settled in Boston, the centre of musical life in New England.

In the College catalogue for 1862–63, Paine appears as Instructor of Music, in the limbo of non-college graduates at the very bottom of the list of College officers. The modest musical announcement of the Homeric era[1] became still more modest; but in the year 1863 Paine gave two courses of University Lectures [1] — one on Musical Form and the other on Instruction in Counterpoint and Fugue. The latter course was repeated the following year, and the announcement became crisp and challenging: 'Instruction in Music is given to those Undergraduates who desire it, and are sufficiently acquainted with the Rudiments.'

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[1] Above, p. 107.

To President Hill, a man of broad sympathies and artistic tastes, we may safely attribute this first solid foothold of music in the curriculum; and to some unknown administrative genius music owes the pious deception by which instruction in counterpoint and fugue was smuggled into the scheme of University Lectures.

Charles W. Eliot became President of the University May 29, 1869, and at Commencement that year Paine received the honorary degree of A.M. President Eliot has often stated to the writer his conviction that music is one of the most desirable of educational subjects, for the student therein is being trained in his mental powers, his ability to draw fine distinctions, in his ear, his eye, his imagination, his emotions; and on the executive side, in his hands and feet; that is, in a comprehensive coördination of his whole make-up, mental, spiritual, and physical. All the greater credit redounds to Eliot for this attitude, because by temperament he did not respond profoundly to music. He loved music, however; heard it often in his home thanks to Mrs. Eliot, who had a remarkably pure soprano voice; and through his children and grandchildren he felt its liberalizing and tonic force. It has taken time and firm persuasion to make people realize that the great geniuses of music, Bach, Haydn, Handel, Mozart, and Beethoven, were just as notable in their field of expression as Chaucer, Shakespere, and Milton in theirs; and that if one who knows nothing of the poets be considered illiterate, the man to whom the glories of music are a sealed book, is one-sided and uncultivated.

In the catalogue for 1871–72 for the first time appears an elective course in Music: The Theory of Music (Harmony, Counterpoint and Choral Figuration, Free Composition). Evidently Eliot's great reform in academic freedom of choice was not to exclude the fine arts. In 1873, Paine became Assistant Professor, and three elective courses were offered: Harmony,

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[1] See Professor Haskins's chapter on the Graduate School of Arts and Sciences, in this volume.

Counterpoint, and Fugue, the last-named including the sonata and the symphonic forms. There were ten students in the Department. The following year a course in the History of Music was added, the number of students had increased to nineteen. In 1875 Paine was promoted to a professorship — one of the earliest examples of such an honor in America.

In looking back over the first two decades of this experiment (1862–82), we are struck by the slow but steady increase of musical ability among the students. Music too often is taught and studied as a kind of higher mathematics; that is, from an intellectual rather than from an artistic point of view. This attitude was somewhat necessary in the early days of the Department, as gifted men were rare. Yet the artistic spirit of New England was rising, for in the first twenty-five years of Paine's teaching there had been in his courses such well-known musicians as George L. Osgood '66, W. F. Apthorp '69, Edward S. Dodge '73, Arthur Foote '74, H. T. Finck '76, George A. Burdett '81, and Owen Wister '82.[1]

Paine gave in 1876 and later years a series of 'evening conversations' on music, for undergraduates, at which the works of the great composers were played or sung. The concerts in Sanders Theatre by the Boston Symphony Orchestra began in 1881. Five chamber concerts were given by the Mueller–Campanari String Quartette and the Beethoven Club in 1882–83. In 1883[2] we find a new course on Free Thematic Music; Forms of Modern Instrumental Music. From 1890 to 1900 there were few changes in the courses offered. The pioneer work in making the serious study of music a regular part of academic training was showing results, and in this decade there were some of the most gifted men who have ever studied at Harvard. It will suffice to mention as prominent types Nicholas Longworth (A.B. 1891) and Robert W. Atkinson (A.B. *summa cum laude* 1891); Lewis S. Thompson, who attained the same honor in 1892; Percy L. Atherton and Ernest H. Abbott (both A.B. *magna cum laude* 1893); Frederick S. Converse (A.B. *summa cum laude* 1893); Edward Burlingame Hill (*summa* 1894); Daniel Gregory Mason (*cum laude* 1895); Robert G. Morse and Frank B. Whittemore

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[1] Both Foote and Wister served as Chairmen of the Visiting Committee on Music and the Department owes much to their constructive policy and loyal support.

[2] As the writer became a student of Professor Paine in 1883 his account is thenceforth colored by actual personal memories.

(1896, the latter *summa*); John Alden Carpenter (*summa* 1897); Blair Fairchild (A.B. 1899); and William C. Heilman (*summa* 1900). For thirty-three years, from 1862 to 1895, when the writer began to teach in the Department, Professor Paine carried on the work single-handed, often giving each year as many as six courses of varied types.

Professor Paine retired in 1905,[1] and died the following year. President Eliot in his report for 1904–05 paid a notable and characteristic tribute to the founder of the Music Department:

> The Department of Music has been built up under his guidance. For many years he himself gave all the instruction in the Department; but it now contains several teachers, and a large and increasing body of students, and it has sent out a considerable number of Harvard graduates who make music their profession. The creation of the Department of Music in Harvard University is all the greater achievement, because it was a new field of work for the University, not supported by any living educational tradition, like that which supports instruction in Hebrew, Greek, Latin, Mathematics, and Philosophy, and not especially congenial to the evolved or opened-out Puritans who for a hundred years have had the management of Harvard College.

In Paine's career as a creative composer the two significant works were the music for *Œdipus Tyrannus*, performed in 1881 at Sanders Theatre, and the grand opera Azara, completed in 1899. Although Azara has never come to a performance on the stage, it contains some beautiful descriptive music, and the composer considered it his masterpiece. Opera, however, is such a composite art with so many warring factors that few composers judged great purely as musicians have managed to blend them in a convincing fashion. Brahms said, 'I would not risk getting married or composing an opera.' Paine was probably dazzled by the example of Wagner, whose genius was at once literary, dramatic, and musical. Azara would have had more likelihood of success had some able dramatic poet prepared the libretto. Nevertheless, it will always be an important landmark in the history of American music. In 1883 Paine composed the

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[1] To mark this event there was presented a silver tea-service designed by Dr. Denman W. Ross, and inscribed as follows by Charles Eliot Norton: 'To John Knowles Paine, the Gift of Pupils, Admirers and Friends desirous to testify to him their sense of the value of his teachings, the beauty of his compositions and the service he has rendered to the Art of Music.' Later Mrs. Paine gave the service to the Faculty and it is always used at their meetings.

Harvard Commencement Hymn (words by Professor James B. Greenough), an uplifting and dignified expression of the spirit of college youth.

The aim of the Department has gradually become twofold: (1) to offer courses which are technical and grammatical in their nature and are meant to provide a thorough training for students intending to follow the musical profession as composers or teachers; and (2) to provide for the needs of the layman by courses which treat of the historical, literary, and aesthetic sides of music. At first only two courses of the latter sort were given, the History of Music and Musical Appreciation, but as we proceed we shall see that the chief growth of the Department has been in this group.

In the technical courses the policy of the Department has always been to teach music as a practical subject. One does not become at home in the grammar of music or gain facility in self-expression via sounds and rhythms by reading textbooks on harmony or by hearing professors lecture. The way to learn to compose music is to compose it; in the early stages, to be sure, under expert and stimulating supervision.

During the decade 1918–28 a logical change in the policy of the Department has been effected as to the proper emphasis to be laid on courses of the two types outlined above. There has been a great expansion in the general courses designed for music-loving laymen, who naturally will always be in the majority. What use is it to compose music if no one be trained to appreciate it through intelligent and sympathetic listening? The course on Appreciation (Music 4) is now announced as 'the analytical study of masterpieces from the point of view of the listener.' It is no more the prime and only object of a department of music to turn out creative composers than for an English department to produce poets. Musical geniuses will arise in our country when the time is ripe for them. Meanwhile we can and should train those who are to welcome them when they appear.

There is also no reason why specialized courses should not be given on single composers or schools, just as in English we find them on Chaucer, Shakspere, or modern novelists. For the last ten years therefore there have been four detailed half-courses subsidiary to Music 4: Brahms and Franck; d'Indy, Fauré, and Debussy; the Life and Works of Beethoven; the

Russian Nationalists. The study of musical history has been broadened by a course on the Development of Choral Music, in which the vocal illustrations are rendered by a four-part chorus of Radcliffe and Harvard students. To the technical courses a vigorous policy of selection and elimination has been applied. To provide for all possible needs the former course in Harmony (Music 1) has been subdivided. The first half, the Elements of Music, is meant 'for those who have acquired a rudimentary knowledge of music from singing in a choir, playing on the pianoforte or organ, or listening intelligently to music.' A test as to accuracy of hearing is given to all candidates for this course. The second half, on Harmony, the grammar of music, is meant for those gifted with a keen and accurate power of hearing, who intend to concentrate in Music and continue their technical studies.

Not all knowledge can be stated in terms of statistics. In such a subtle subject as music there are many aspects which evade analysis and exact formulation. But as to the just balance between these two groups of courses the figures are significant. In 1928–29 the seven technical courses were taken by about fifty students, whereas the three general courses contained from one hundred and fifty to one hundred and seventy-five. It was Paine's original policy — and it has been followed ever since — that a Harvard student should secure a broad general education and at the same time in his impressionable years begin a thorough training of any artistic powers with which he might be endowed. Official records show that a student able in music is also good in other subjects. With negligible exceptions the honor men in Music have been remarkable for their high general average.

This striking growth in number of students and in variety of courses has demanded expansion and changes in the teaching staff. In 1903 Frederick S. Converse was appointed Instructor and later Assistant Professor but resigned in 1907, to the great regret of the Department, in order to devote himself to original composition. In 1905 William C. Heilman, after four years of study abroad, was appointed Instructor and has borne ever since a prominent part in the development of the Department. Edward Burlingame Hill, a grandson of President Hill, joined the staff in 1908, Archibald T. Davison in 1910, and Edward Ballantine in 1912. They have all been advanced in official

Standing: Woodworth, Piston, Leonard. *Seated:* Davison, Spalding, Hill, Heilman, Ballantine

THE DEPARTMENT OF MUSIC

1928

FOOTE PAINE CONVERSE

THREE HARVARD COMPOSERS

grade and are recognized as authorities in their respective subjects.[1] In the year 1928–29, there are five teachers of Faculty rank, an instructor, W. H. Piston (A.B. 1924), and two assistants, Clair Leonard (A.B. 1923) and G. W. Woodworth (A.B. 1924). Professor Hill became Chairman of the Department on the resignation of the writer from that position in 1928.

From this account of the Department's growth, it is hoped that certain ideals may shine forth. We shall make genuine progress as a musical people by raising artistic standards and living up to them at all costs.

4. The Pierian Sodality Orchestra

The Harvard students' orchestral society with this grandiose name was founded in 1808. Its records[2] are valuable documents, for there is an unbroken chain of cause and effect between the Pierian, the Harvard Musical Association founded by its graduate members in 1837, and the Boston Symphony Orchestra. We find among the officers and members many names, such as Minot, Cabot, Palfrey, Jackson, Apthorp, distinguished in varied fields throughout New England annals. There is, to be sure, considerable emphasis laid upon 'elegant suppers,' the serenading *puellarum pulcherrimarum*, and the artistic glow caused by alcoholic stimulants. The term 'sodality' means companionship, and music has power to establish fraternity and coöperation. Nor is music a didactic art; it has always been closely connected with the love impulse; and these events happened before legislation had deprived us of wine and beer.

These records are regrettably deficient in the important matter of just what types of instruments and how many were used, what kind of music was played, and what were the standards of performance and taste. It is clear, however, that the favorite and at times the only instrument employed by the Pierian was the flute: oldest of the wind instruments and easiest to play upon in some fashion.[3] What cooling strains there must have been to soothe the hearts of young men in a restless, growing country! Once, in 1832, the Pierian spring all but ran dry. It sank to a single member, Henry Gassett '34. This hero kept the records, practised his flute alone in his room, in due time gathered about him two friends; and the spring flowed once more.

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[1] Several men have had a temporary connection with the Department, who afterwards withdrew to occupy important positions elsewhere or to pursue original work. The most prominent are Henry L. Stone (A.B. 1901), Arthur M. Hurlin (A.B. 1906), Philip G. Clapp (A.B. 1909), and George L. Foote (A.B. 1908).

[2] Harvard University Archives.

[3] For an historical account of the flute since early times see the monograph by the late Professor Howard in *Harvard Classical Studies*, iv (1893).

One day after a College exhibition the Sodality, which furnished the music on such occasions, entertained former members who had graduated. From that genial occasion sprang the Harvard Musical Association, organized at Commencement, 1837, in a meeting over which the Rev. Jonathan M. Wainwright (A.B. 1812), later Bishop of New York, presided. This association of Harvard graduates, incorporated in 1845 with headquarters in Boston, was a musical leaven to the community. It gave some of the earliest chamber concerts heard in Boston; it organized the first Boston symphony concert at the old Music Hall on December 28, 1865, conducted by Carl Zerrahn. Out of its friendly dinners and discussions came Dwight's Journal of Music, the Cecilia Society, much agitation for the teaching of music at Harvard, and generous donations for the same.[1]

The list of officers and members of the Pierian in 1865-66 includes several men who afterwards became well known as musicians or patrons of music: George L. Osgood, President; Francis A. Carpenter, Director; J. Arthur Beebe, first violin; Henry Goddard Pickering, horn; William P. Blake and William G. Farlow, pianists. The following year, there were players on the tympani, the bass drum, and the triangle. The kettle-drums were apparently a little unfamiliar as the player is officially recorded as a 'tympianist.' During the next few years the Sodality included men like Warren A. Locke and William Foster Apthorp of the Class of 1869, both of whom undertook a professional musical career;[2] but one cannot say that a real orchestra was formed before the concert of June 21, 1871, when only the percussion instruments were wanting for a complete orchestral ensemble. By 1893 the Sodality had become sufficiently ambitious to plan a concert in Sanders Theatre, for which Paderewski, then on his first American tour, was to be the soloist. President Eliot refused to allow it because admission would be charged, explaining the exception made in favor of the Boston Symphony Orchestra because it was 'educational.' Why, inquire the Sodality records, would n't Pierian-cum-Paderewski be educational? Echo answers, 'Why?'

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[1] *The Harvard Musical Association, 1837-1912.* The Association now has a clubhouse at 57A Chestnut Street, Boston, and an excellent library of music.

[2] For Locke, see above. Apthorp taught at the New England Conservatory and elsewhere from 1872 to 1886, when he entered the field of musical criticism, and became 'undoubtedly one of the greatest critics America has produced.' — *Dictionary of American Biography.*

We find complaints in the records at the difficulty of making headway under the shadow of the Boston Symphony Orchestra. It was undoubtedly annoying to give public concerts to slim houses instead of to the admiring audiences that inferior student orchestras enjoyed in small college towns. But it is probable that in the long run the example of the greater orchestra helped the less. The Pierian Orchestra has had its ups and downs, but the curve has always tended upward, especially when it has had a good conductor; for a conductor is to an orchestra as a general to an army. It has had four distinct periods of unusual attainment: under Walter Forcheimer '87, a gifted violinist who afterwards became a noted ophthalmologist; Philip G. Clapp '09, since Professor of Music in Dartmouth and Iowa, and an able composer; Chalmers Clifton '12, who since graduation has conducted Mrs. E. H. Harriman's Civic Orchestra in New York; and Walter H. Piston '24, who has become a member of the Department. In 1929 the Orchestra is both trained and conducted by Nicolas Slominsky, a professional musician of versatility and commanding power. With the increase of students of non-English blood in Harvard College, including many from the most musical peoples in the world, the material has improved, and the quality of the Orchestra shows unusual promise.[1]

5. The University Glee Club

Since the early nineteenth century there had been informal groups in the College devoted to vocal music. The first formal organization, however, the Harvard Glee Club, was established in March, 1858. 'It was thought,' so say the records, 'that enough singers could be found in the College to form a good society at once; and that thus the two societies, the Pierian

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[1] It may be recorded that three Harvard men have been regular members of the Boston Symphony Orchestra: Morris Grünberg (A.B. 1907), Samuel Seiniger (A.B. 1913), and Lloyd A. Stonestreet, special student, 1920–21.

Sodality composed of instrumental performers, and the Glee Club composed of vocalists, could coöperate and there would be pleasant intercourse among those who were good musicians.' [1] The first concert of the combined societies was given before an enthusiastic house in Lyceum Hall on June 9, 1858, and Dwight's Journal of Music had a long and favorable review.

PROGRAMME

1. Nord Stern Quadrilles; Strauss.
2. Serenade: Eisenhofer — Rhine Wine Song: Mendelssohn.
3. In Terra; Solo. (Don Sebastio; Donizetti.)
4. Integer Vitae; Fleming.
5. Love; Cherubini.
6. Huntsmen's Farewell; Mendelssohn.
7. Amelie Waltzes; Lumbye.

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8. Wecker Polker (Ballet of Faust).
9. Serenade; Baker.
10. Sextette. (Czar and Zimmerman); Lortzing.
11. Drinking Song; Mendelssohn.
12. Cavalier Song; Boott.
13. Pot-Pourri (Martha): Flotow.
14. College Songs. — Fair Harvard, with words by Rev. Dr. Gilman. Written for our Bi-Centennial in 1836.

The significance of this event is that the first concert was one of singers and players together. The term 'glee' is of import, for it is the Anglo-Saxon word *gligg* for music itself. The glee as a musical composition is defined by authorities as 'a piece of unaccompanied vocal music in at least three parts and usually for *men*.' That musical students therefore should form a Glee Club is a clear illustration of cause and effect.

During the '60's and '70's, the Club had varied fortunes, its artistic status obviously depending upon the quality of the material and the skill and magnetism of the leader.[2] The number of good voices fluctuates from year to year, and in those days students were reckoned in hundreds rather than in thousands.

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[1] Quoted from the account in the *Harvard Magazine* of November, 1864, which also states that the two societies shared rooms and had an excellent library.

[2] One of the most gifted Glee Club men in early times was Samuel W. Langmaid (A.B. 1859, M.D. 1864), who afterwards became a prominent throat specialist and was the consultant for many famous singers both European and American. For many years he was tenor soloist at Trinity Church, Boston.

Compositions for men's voices are somewhat limited, although artistic and effective pieces for this medium had already been written by Webbe, Hatton, Mendelssohn, and Schumann. It is fair to state that the early programmes show a strong proportion of such compositions supplemented later by original pieces of Foote, Osgood, Arthur Thayer, and other American musicians. A Freshman Glee Club, with eighteen members, was formed in 1868. In 1870 the Advocate complained that the Harvard Glee Club, limited to sixteen members, constituted an 'oligarchy of vocal art' which kept out some of the best talent in the College. Yet the Club reached its first high level of excellence shortly after, when its fortunes were directed by Arthur Foote as leader, and Edward S. Dodge and Richard H. Dana as chief officers.

A notice in the Magenta of the Class Day concert for 1873, suggesting that the College Songs at the end be given up, anticipates a desire of the students themselves for better music. But in 1875 'the College Songs were received with such favor as to prove that they ought never to be omitted.'

A typical programme of this period is that of a joint concert by the Orchestra and Glee Club given at Salem on April 23, 1875:

1.	Overture, "Jean de Paris"	Boieldieu
2.	Spring's Return	Weber
3.	Solo for Clarinet	
4.	Tenor solo	
5.	Fleurs Farcies	Langé
6.	The Three Glasses	Fisher
7.	Allegretto and Minuet, Symphony in G	Haydn
8.	Ave Maria	Abt
9.	Andante from Trio for Violin, 'Cello and Pianoforte	Mendelssohn
10.	Chorus of Pilgrims from Tannhaüser	Wagner
11.	March	Zirkoff
12.	College Songs	

There is certainly enough standard music here so that we need not scorn the taste of that period.

The decade from 1880 to 1890 saw a remarkable line of musical and inspiring leaders, notable among them being Thomas Mott Osborne '84, Benjamin Carpenter '88 (brother to the composer John Alden Carpenter), and also many excellent tenors and basses.[1] In 1887 the two branches of music were united under the title 'Glee Club–Pierian Association' of which the officers were: President, George A. Morrison '87; Treasurer, Eugene R. Shippen '87; Secretary, James Loeb '88.

With the natural spirit of rivalry inherent in young men much criticism, not supported by facts nor founded on just grounds of comparison, has always existed as to the relative merits of the Orchestra and the Glee Club. For reasons already set forth, we must remember that it is easier to sing than to play well together. With singers the instrument and the player are closely related parts of the same being, and in any given number there are always more potential tenors and basses than violinists, 'cellists, or flutists, not to speak of players upon such subtle instruments as the clarinet, horn, and bassoon. In any group of students there are always some with true voices and a rhythmic sense, about whom the others rally to make a satisfactory effect. How different is the situation in an orchestra, where each player, on such varied media as strings, wood-wind, brass, and percussion, must be approximately perfect! Otherwise the ensemble effect as to intonation, euphony, and rhythmic precision may be spoiled — and often is — by a single incompetent player. After nearly fifty years' observation of players and singers at Harvard, the writer wishes to record that he sees no essential difference in excellence between them, except that the same amount of musical ability and diligent work will produce more artistic results with voices than with instruments.

During the twenty years from 1890 to 1910 there is little to record. The Glee Club, like any organization, had its good and poor seasons by reason of variation in material and in the skill of the leader. In both the Glee Club and Orchestra the question of a professional coach has often been as hotly debated as in connection with athletic teams. As a general rule, the singers have been able to train themselves fairly well, since the technique as to a proper use of the voice is less complicated and subtle than is the case with instruments.

That which may be called the Renaissance of the Glee Club came with the policy of having the members trained and directed by a professional musician. Dr. Archibald T. Davison (A.B. 1906) became University Organist and Choirmaster in 1911. A year later the Glee Club elected him their Director; and at the same time he became Instructor in the Department of Music. This change was due to the convergence of several tendencies: the marked improvement in taste during the last twenty-five years, the preference of the students for standard works, and chiefly the skilful guidance of Dr. Davison. For such work the Glee Club's present director is well equipped: he is endowed with the power of leadership; when young he conducted a boy choir, was also an organist, and studied with distinction at Harvard and abroad.

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[1] Beginning with the year 1880 the writer speaks from personal memory based upon an actual association with leaders and singers. The allegation, it may be stated in passing, that prior to 1912 the Glee Club sang *only* music of the 'Bulldog on the Bank' type, is both unfair to past members and leaders and unsupported by documentary evidence.

Under the present régime important changes have taken place and the interest in singing has spread to a much larger body of students. Each year there are several hundred candidates for the Glee Club, and from them is formed by careful selection a chorus of from two hundred to two hundred and fifty representative voices. Thus the wish of the students fifty years ago has been realized, and Harvard may fairly be called a 'singing college.' More attention than formerly has been paid to enunciation and to expression. This is desirable, for men's voices as an artistic medium have obvious disadvantages — something like trombones or divided 'cellos in the orchestra. They are limited in range, are likely to become heavy and inflexible, and their tone just by reason of its richness and sonority is often cloying. Men's voices should sing with vigorous life — thus fulfilling their innate characteristics — with all possible regard for *nuance* and variety of tone and, above all, with photographic clearness in pronunciation.

Finally, a significant improvement has been made in the type and quality of the music sung. Original compositions for men's voices are limited. With discriminating selection and skill in arrangement, Dr. Davison has widened the repertoire of the Club until it now ranges from the early Italian composers through the English madrigalists, through Bach and Handel, down to the works of modern composers like Sullivan, Bantock, Holst, Vaughan Williams, and Florent Schmitt. It is an open question whether we know exactly how the works of Palestrina and Vittoria sounded and how they should be sung. It is certain that they were not composed for a chorus of men's voices as we now treat that medium. They were an intricate texture of melodic lines often widely spread, the upper parts taken by falsetto voices, technically called *Castrati*. This music, however, of the fifteenth and sixteenth centuries is so effectively written for voices — it was before the time of emphasis upon instrumental idiom — that the students have shown a marked interest in it and thus are broadening their standards of taste and improving their vocal technique.

Dr. Davison, realizing the inevitable limitations of men's voices, has formed a chorus of young women — the Radcliffe Choral Society, and the mixed chorus from the two organizations has done some remarkable work. Each year at Christmastide a service of carols is given in Appleton Chapel; and in connection with the Boston Symphony Orchestra there have been artistic performances of Brahms's Requiem, Beethoven's Ninth Symphony and Mass in D, and Honegger's King David. The Glee Club alone has sung the choruses of Stravinsky's *Œdipus Rex* both in Boston and New York. In the summer of 1921 the Glee Club, under the auspices and at the invitation of the French Government, made a memorable tour in France — later extended to Italy, Switzerland, and Germany — and were warmly praised by European musicians and critics.

The Glee Club is thus carrying on its honorable traditions and is manifesting the universal nature of music's appeal. Several modern composers have written pieces specially for it, among them Ropartz, Milhaud, and Poulenc.

HARVARD GLEE CLUB

Paris Programme, June 28, 1921

Adoramus Te	*Palestrina*
In Dulci Jubilo	*Old Chant*
Crucifixus	*Lotti*
Lo, How a Rose	*Praetorius*
Miserere	*Allegri*
Now Let Every Tongue Adore Thee	*Bach*
Suabian Folk Song	*Brahms*
Now is the Month of Maying	*Morley*
Come Again, Sweet Love	*Dowland*
Drake's Drum	*Coleridge-Taylor*
Serenade	*Borodine*
Bedouin Song	*Foote*
Love Songs	*Brahms*
Hallelujah, Amen	*Handel*

6. THE INSTRUMENTAL CLUBS

Neither the Pierian Orchestra nor the Glee Club represents every phase of music, even if the question be raised, 'What is "good music"?' The light, humorous, and popular side of life has always been worthy of expression in musical language. The Instrumental Clubs, therefore, are entitled to enjoy playing such instruments as the banjo, mandolin, and guitar,[1] the tone of which is produced by plucking with the finger. The effect gained from plucked strings, technically known as 'pizzicato,' is very impressive, because the basic element in all music — the rhythm — is so clearly defined.[2] Numerous examples may be found in symphonic literature, Tchaikovsky in his Fourth Symphony even writing a whole movement for pizzicato strings, the effect being that of an idealized banjo club. Since the early '80's there has always existed some activity of the students with these plucked instruments. In 1887 a Guitar and Mandolin Club was organized and often no slight ingenuity and artistic skill have been shown by both players and leaders.

Of late years several important changes have been made by devotees of these instruments. A few strings, violas and 'cellos, have been added to the ensemble, thus giving a more sustained background, and pieces better suited to the medium from Schubert, Delibes, Massenet, and others have been arrangd. Since 1917 the official name has been changed to the Instrumental Clubs, and a group of voices has been added, so that 'college songs' and light vocal literature may be adequately rendered. For with the present emphasis upon classical music, it would be unwise and unfair to allow the pendulum to swing entirely to this side. We must not forget that some of the Harvard songs, notably 'Up the Street,' by Robert G. Morse '96, several by Benjamin Carpenter '88, 'Odd Fellows' Hall,' by Robert W. Atkinson '91, others by Lewis S. Thompson '92 and John H. Densmore '04, and 'Soldiers' Field,' by R. K. Fletcher, '08, are excellent pieces of music from a strictly technical point of view.

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[1] One of the great artists of modern times is the Spanish guitarist, Segovia.

[2] According to Redfield in his *Music: A Science and an Art*, sixty violinists cannot produce as much pizzicato effect as four proficient banjoists. Compare also the Hawaiian Ukelele and the Russian Balalaika. It has become the custom to have a concert of the Yale and Harvard Instrumental and Glee Clubs the night before the annual Harvard-Yale football games.

Since many people like these, the Instrumental Clubs are doing a service in keeping them alive. During the last few years there have been in this group some exceedingly gifted banjoists, violinists, and pianists; and many of the concerts, as a form of light entertainment, have been of a high order. Music is often considered from a point of view too exclusively serious. May we never have any cakes and ale? That great artist, Debussy, says 'Music is meant to give pleasure.' The members of the Instrumental Clubs may be called the Jongleurs, the noble Bohemians of the University; and have earned their niche in the many-chambered hall of musical fame.

* * * * * * * * *

Harvard, the oldest of American colleges, may fairly claim to have done the most for music. A large majority of the creative composers born in our country is of Puritan New England stock. Of that blood are Chadwick, Gilbert, Parker, Whiting, Osgood, Foote, Carpenter, Converse, Atherton, Mason, Hill, Clapp, Fairchild, Ballantine, Thompson, and Sessions; and all but the first four are Harvard graduates. If music now touches many phases of life in Harvard, it is because the students themselves insist upon having music, because two far-seeing presidents have fostered music, and because many Harvard teachers in various fields have been cultivated and enthusiastic lovers of this art. At athletic contests music is a stimulating factor through the College Band and the songs of the students. Religious services would lack a vital part of their appeal were it not for the singing of the College Choir and the organ playing of the Choirmaster. The University Glee Club and smaller class organizations give opportunity each year for several hundred students to learn how to use their voices and to become familiar with standard musical literature. The Pierian Orchestra, the Instrumental Clubs, several ensemble groups, string quartets, and so forth, all devote themselves to instrumental music, a field in which, by reason of the inherent difficulties of the media, outward results often show but little of the skill and patient perseverance of those who play upon violins, clarinets, and horns. The five annual Expositions of Chamber Music by Mr. Arthur Whiting, now in their twenty-fourth year, are attended by four to five hundred students who thus begin to train themselves in that alert and concentrated hearing without which there can be no real appreciation of music. The dozen or more courses offered by the Department are taken each year by about two hundred and fifty students. Lastly, the good effects of this growth have not been limited to Harvard, or even to New England. As our University has become national in scope, so the influence of Harvard music has spread over the country. Men trained here are now professors in many of the leading colleges and universities,[1] while others have become critics or private teachers. Practically all these departments of music have founded their policy and procedure upon principles worked out at Harvard. This influence even crossed the seas, for besides the epochal European tour of the Glee Club, the writer in 1920–21 gave a series of four illustrated lectures in eight of the French universities, including the Sorbonne, and in the following winter Professor Hill also lectured in several of them. Two of the most significant of recent musical projects on the Continent, the American Academy at Rome and the school at Fontainebleau, strongly reflect the Harvard spirit. Harvard teachers have lectured in both of these organizations and in the Academy's six years of existence four Harvard graduates[2] have won fellowships at Rome.

7. PRIZES, FELLOWSHIPS, AND OTHER BENEFACTIONS

During the last half-century music at Harvard has prospered greatly through the gifts of many; for music can never pay its way by 'gate receipts,' and must always depend upon private generosity. For talented students in music there are now four prizes[3] and three fellowships.[4] The Whiting Expositions are partially supported by a fund of ten thousand dollars from Charles Osmyn Brewster '79. One of like amount from J. Arthur Beebe '69 and another of fifteen thousand dollars in memory of W. Kirkpatrick Brice '95 are devoted to the advance of music and the needs of the Department. Several alumni in 1925 raised ten thousand dollars for running expenses,[1] and in 1926 the Carnegie Foundation gave the Department seven thousand five hundred dollars. In 1928 Mrs. Horatio A. Lamb gave twenty-five thousand dollars in memory of her husband of the Class of 1871, in order to provide every year for the residence of some distinguished foreign composer. For many years Mrs. Frederick S. Coolidge, whose husband was in the Class of 1887, has given under the auspices of the Department several fine concerts annually by such organizations as the English Singers, the London String Quartette, and the Prague Choir. The largest and most beneficent gift was eighty-five thousand dollars from James Loeb '88, for a Music Building designed by John Mead Howells '91, and opened in 1914. Twenty thousand dollars was added to meet the final cost by a few donors, such as Paul and Felix Warburg and Dave H. Morris '96. A maintenance fund of fifty thousand dollars was quickly raised by general subscription. *Vivat crescens!*

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[1] For example, Daniel Gregory Mason at Columbia; Charles L. Safford (A.B. 1894) at Williams; Leo R. Lewis (A.B. 1888) at Tufts; Harry R. Pratt '06 at Virginia; Philip Greely Clapp (A.B. 1909) at Iowa; Royal D. Hughes (PH.D. 1926) at Ohio; Arthur W. Locke (A.B. 1905) at Smith; George S. Dickinson (A.M. 1912) at Vassar; Randall Thompson (A.B. 1920) at Wellesley; Melville Smith (A.B. 1920), Donald N. Tweedy (A.B. 1912), and William Ames (A.B. 1924) at the Eastman School of Music; Carl P. Wood (A.B. 1906) at Washington; Howard G. Bennett (A.B. 1917) at Vermont; and Adelbert W. Sprague (A.M. 1907) at Maine.

[2] Randall Thompson (A.B. 1920), Walter Helfer (A.B. 1919), Alexander Steinert (A.B. 1922), and Roger H. Sessions (A.B. 1915). The writer for five years was chairman of the jury to estimate the original compositions on the worth of which fellowships are awarded.

[3] One of $100 for the best vocal composition, founded by Francis Boott '31; the George Arthur Knight Prize of $75 for an instrumental piece, founded by W. H. Knight '03; a prize of $50 for a piece in polyphonic style, founded by the Bohemian Club of New York; a similar prize of $50 to the student with the highest combined average in mathematics and music, founded by Charles J. Wister.

[4] One of about $525 annually from a bequest of Elkan Naumburg of New York, and two of $1500 each from a fund left by Mrs. John K. Paine in memory of her husband.

Codetta

From the foregoing narrative certain conclusions stand forth: that however stony the soil, an art so closely bound up with human nature as music, takes root and thrives in proportion as the soil is cultivated — die it never will; that Harvard students may gain a general education and at the same time develop their artistic nature; beginning, in fact, to acquire that broad cultivation which marks the man of the world; that upon men of this type our country relies for its composers, teachers, patrons, and leaders of public opinion. With Harvard men loyal to the high standards set up these sixty years past, we shall see the achievements of that fruitful period augmented and surpassed.

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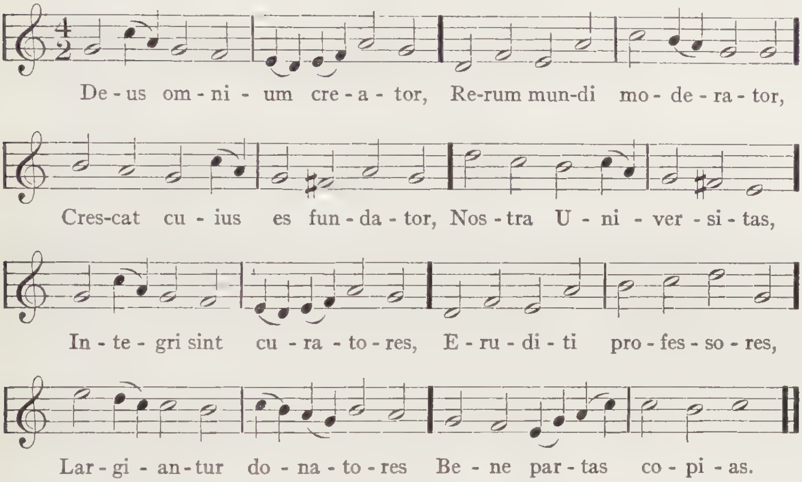
[1] Largely through the efforts of the Visiting Committee on Music of which M. A. DeW. Howe, '87 is now Chairman.

HARVARD HYMN

John Knowles Paine James Bradstreet Greenough


De - us om - ni - um cre - a - tor, Re-rum mun-di mo - de - ra - tor,
Cres-cat cu - ius es fun - da - tor, Nos - tra U - ni - ver - si - tas,
In - te - gri sint cu - ra - to - res, E - ru - di - ti pro - fes - so - res,
Lar - gi - an - tur do - na - to - res Be - ne par - tas co - pi - as.

V. THE FINE ARTS

1874–1929

By George H. Chase, Ph.D.
Hudson Professor of Archaeology

1. The Norton Era, 1874–1908

THE Fine Arts are among the younger subjects of instruction in Harvard College. Their first appearance in a formal way was in 1874, when the Corporation appointed Charles Eliot Norton Lecturer on the History of the Fine Arts as Connected with Literature.[1]

The appointment was an unusual one, inasmuch as the History of Art had never before found a place in the Harvard curriculum, or indeed, with one or two exceptions, in that of other American colleges. There were art schools in several American cities, organized more or less in imitation of the French Ecole des Beaux Arts, and attended almost exclusively by students who looked forward to professional careers as sculptors, painters, or architects; but the academic world had been inclined to regard art as something quite apart from its interests. To Norton, who as a friend of Ruskin shared his views on the intimate relation between art and life, this point of view was utterly false, and his success in inspiring in his students a conviction of the importance of the fine arts as an expression of the spirit of past ages, soon made him an outstanding figure in the Harvard Faculty. At the same time, he was not oblivious of the importance of technical training. There was already in the University an instructor in free-hand drawing and water color, Charles Herbert Moore, who had been appointed in 1871; but until 1874 he had taught in the Lawrence Scientific School exclusively, and the instruction which he offered was not open to undergraduates in Harvard College. Norton immediately saw the desirability of coöperating with Moore, thus establishing from the very beginning a principle which has ever since been followed by the Division, namely, that instruction in the history of art should be accompanied by instruction in theory and principles, that the training of eye and hand is no less important than the training of memory.

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[1] Mr. Henry James has called my attention to a letter from Mr. Norton to President Eliot, which has an interesting bearing on this appointment. It is dated January 15, 1874, and begins: "In regard to the informal proposition you made to me a day or two since the following considerations occur to me." It then goes on to expound Norton's belief in the importance of the Fine Arts "In a complete scheme of University studies" and his ideas in regard to methods of teaching the subject.

In the catalogue for 1874–75, therefore, we find two courses in the Fine Arts announced for the first time: Principles of Design in Painting, Sculpture, and Architecture (Fine Arts 1), given by Mr. Moore; and The History of the Fine Arts and their Relations to Literature (F. A. 2), given by Mr. Norton. That these courses made an immediate appeal is clear from the fact that the one was elected by twenty-nine upper-classmen and the other by thirty-four, and that Norton was appointed Professor of the History of Art during the year. In 1875 he offered a third course, The Rise and Fall of the Arts in Athens and Venice. The next years witnessed some minor changes in the titles of the courses, but by 1881 the list assumed the form which was retained with little change for many years, Moore giving every year Principles of Delineation, Color, and Chiaroscuro (F. A. 1) and Principles of Design in Painting, Sculpture, and Architecture (F. A. 2); and Norton offering in alternate years his popular Ancient Art (F. A. 3) and Roman and Mediaeval Art (F. A. 4), in addition to a course of more advanced character.

To his teaching Norton brought the fruits of his remarkably wide experience and acquaintance with men of letters in Europe and America, and in his lectures from first to last he emphasized the ethical and social implications of the fine arts. He never hesitated to turn aside from the subject in hand to comment on current events and matters of public or academic interest, so that his courses covered a much wider range than is suggested by their titles. Many a graduate of the last quarter of the nineteenth century recalls his attendance on Norton's lectures as an experience which opened to him a new world.

In 1885 came the first announcement of a course in the field of Greek archaeology — The Antiquities of Athens and Olympia — offered by Harold N. Fowler (A.B. 1880). This development was a natural one, since Norton was always especially interested in archaeological research. In 1879 he was the moving spirit in the organization of the Archaeological Institute of America. He was largely responsible for the establishment of the American

School of Classical Studies at Athens in 1881, where Dr. Fowler had been one of the earliest students. Instruction in Greek archaeology was interrupted in 1888 when Fowler accepted a professorship at Phillips Exeter Academy.

In 1893–94, when Norton was away from Cambridge, instruction in the history of ancient art was given by Edward Robinson (A.B. 1879), another early student in the School at Athens, and at that time Curator of the Classical Department at the Boston Museum of Fine Arts. In the same year Herbert Langford Warren gave a course on the Development of Architectural Styles, a first step toward the establishment of the Graduate School of Architecture. In his lectures Professor Warren discussed the history of architecture in a broad spirit, emphasizing the relation of the architecture of every age to the civilization from which it sprang, and his courses supplemented very materially the instruction offered in the fine arts.

More important still for the development of the artistic field was the erection, in 1894–95, of the Fogg Art Museum. Founded by the widow of William Hayes Fogg of New York in memory of her husband, this building was planned to house their own collections, together with casts, photographs, and slides, and to provide lecture rooms and offices for the teaching staff. It was built without consultation with the teachers concerned from plans by Richard Hunt, and never proved a satisfactory building even for the limited uses for which it was designed; but, in spite of these defects, it remained the home of the department for thirty-two years. Mr. Moore was appointed the first Curator of the Museum; in 1896 his title was changed to Director, and in the same year he was appointed Professor of Art. The income which was a part of Mrs. Fogg's bequest was used at first for the purchase of casts and photographs of works of art, of which a large and very useful collection was rapidly acquired. A beginning was also made of a working library of books on the fine arts.

Although the Museum was not designed for the exhibition of original works, it very soon became evident that it was destined to contain them. In the first year of its existence, sixteen Greek vases were loaned for exhibition by Edward P. Warren (A.B. 1883), and the two collections of engravings, bequeathed to the University by Francis Calley Gray (A.B. 1809) and John W. Randall (A.B. 1834) and since deposited in the Boston Museum of Fine Arts, were transferred to the Fogg Museum in 1895 and 1896. These collections numbered over thirty thousand prints, including many important examples; and the Gray and the Randall Funds, though small, provided money for their gradual increase. In 1897–98, a beginning was made in another field, with the purchase of a pencil drawing by Samuel Prout and a water-color drawing by William Hunt. Moore offered in 1901 and for several years thereafter an advanced course on The History and Principles of Engraving, in which constant use was made of the prints in the Gray and Randall Collections.

The formative period of the department may be said to end with the year 1898, when Norton retired.[1] In the twenty-four years that had elapsed since his appointment in 1874 the Fine Arts had become firmly established as a field of University instruction; certain fundamental ideas as to aims and methods of teaching had been worked out; and the Department had acquired a home. Among the ideals which had become firmly established was the principle that the history of the fine arts should always be related to the history of civilization; that monuments should be interpreted as expressions of the peculiar genius of the people who produced them; that fundamental principles of design should be emphasized as a basis for aesthetic judgments; and that opportunities for training in drawing and painting should be provided for all serious students of the subject.

For some years after Norton's resignation no striking changes were made in the plan of instruction. Moore took over Fine Arts 4, now called The Fine Arts of the Middle Ages and the Renaissance; Mr. Robinson, appointed Lecturer on Classical Archaeology, carried on for four years with marked success the traditions of the course on Ancient Art, and guided advanced students in research in archaeology — especially in the study of Greek vases. In 1900–01 a course on the History and Principles of Landscape Design, was given for the first time by Frederick Law Olmsted (A.B. 1894) 'with occasional lectures by Professor Shaler,' and a course on the Theory of Design was offered by Dr. Denman W. Ross (A.B. 1875), primarily for students of architecture.

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[1] From the time of his retirement until his death on October 21, 1908, Charles Eliot Norton's services to Harvard were many. He was a member of the Board of Overseers from 1899 to 1908. To commemorate his eightieth birthday the *Harvard Graduates' Magazine* (xvi, 217–230) published tributes from many men prominent in American life. The same magazine (xvii, 223–233) contains an extended notice by William Roscoe Thayer. Much biographical material is preserved among Norton's books and papers which, through the generosity of friends, were purchased for the Harvard Library. For fuller accounts of his life see *Letters of Charles Eliot Norton* with a biographical note by Sarah Norton and M. A. DeWolfe Howe (1913) and *Charles Eliot Norton; Two Addresses*, by Edward Waldo Emerson and William Fenwick Harris (Houghton Mifflin Company, 1912).

During these years considerable additions were made to the collection of original works. Especially important was the activity of Edward Waldo Forbes (A.B. 1895), whose interest in the fine arts had been largely inspired by Norton. In 1899 Mr. Forbes began to deposit in the Fogg Museum, as indefinite loans, many of the pictures and other objects which he had begun to collect, especially Italian paintings and works of classical sculpture. Among the loans which were made in 1898–99 are a Florentine tabernacolo, an Adoration of the Magi, of the school of Ferrara, a portrait of a Procurator of St. Mark, the beautiful ancient copy of the Meleager of Scopas (in some respects the best of the extant copies of that work by the famous Greek sculptor), a Greek head of Aphrodite, and the front of a Roman sarcophagus with a relief representing a battle of Greeks and Amazons. In the acquisition of these treasures Forbes was constantly aided by Richard Norton (A.B. 1892), whose interest in the Museum, like that of other members of his family, never failed. In 1900, through Forbes's initiative, the Class of 1895 presented to the Museum a Greek statue of Aphrodite, and in 1902, James Loeb (A.B. 1888) whose interest in the fine arts was also due to Professor Norton, loaned his large and valuable collection of Greek and Egyptian bronzes.

Robinson accepted in 1902 the directorship of the Boston Museum, which made it impossible for him to continue teaching at Cambridge, and for the next two years the course on Ancient Art was omitted. Various makeshifts were adopted to provide some instruction in this field. In 1902–03 Dr. George H. Chase (A.B. 1896), an instructor in Greek, offered a course on the Topography and Monuments of Athens, and in the next year a course on the History of Greek Vase Painting. With the catalogue of 1903–04, moreover, began the practice of listing with the Fine Arts courses those offered by other departments in related subjects such as the History of Architecture and Landscape Architecture, Santayana's Aesthetics, Anthropology, Classical Archaeology, the Life of the Greeks and the Romans, German Religious Sculpture, and French Life in the Seventeenth and Eighteenth Centuries. This list shows how much the growth of other departments had served the study of the Fine Arts. Arthur Pope (A.B. 1900) who had been assistant to Professor Moore in the previous year, offered for the first time a course in Landscape Painting in 1905–06. Four years later Pope and Chandler R. Post (A.B. 1904), then Instructor in Romance Languages, offered a joint course in Italian Painting, and Francis G. Fitzpatrick (A.B. 1901), who had for some years been assistant in the courses in the History of Art, gave his first independent course: on the History of Mediaeval Sculpture. All these innovations show how the younger members of the Department were constantly striving to enlarge the offering, and to enlist the coöperation of members of other departments.

Meanwhile, the collections in the Fogg Museum continued to grow, as old friends added to their gifts or loans, and new friends came to appreciate the opportunity offered to bring to the attention of young men and women, in their most impressionable years, original works of art. Forbes made constant additions to the collection of paintings, water colors, and ancient sculpture. Loeb lent a large collection of Arretine vases, moulds, and fragments; a bronze 'Praenestine' cista; and three remarkable Greek bronze tripods of archaic style. A loan collection from Walter M. Cabot (A.B. 1894), gave the Museum its first group of works of Japanese art. All these loans were for long periods of time; indeed, many of them still form a part of the Museum collections. Among important permanent accessions may be noted a diptych attributed to Rogier van der Weyden, the bequest of George W. Harris of Brookline; Turner's drawing of Devonport, once owned by Ruskin, the gift of Charles Fairfax Murray of London; an Attic grave relief and a fragment of a Renaissance relief representing an angel, the gift of Mrs. Edward M. Cary of Milton; and a collection of forty-seven bronze reproductions of Italian and French Renaissance medals, the gift of Horatio Greenough Curtis (A.B. 1865).

2. New Blood, Growth, Development, 1909–1928

Charles H. Moore resigned in the spring of 1909 after thirty-eight years in the service of the University. To fill his place as Director the Corporation turned to Forbes, whose interest in the Museum had been constant for many years. The problem of a head for the Department was more difficult. The attitude of the Corporation was that if a man of Norton's quality could be found, he should at once be appointed Professor of Fine Arts. When a canvass of the country showed that this ideal could not be attained, it was decided, as President Eliot put the matter, to let the 'young fellows' who were left see what they could do. Pope, therefore, was appointed Assistant Professor of Fine Arts, and undertook with Martin Mower, who had been Moore's assistant for several years, a course on the Principles of Drawing and Painting, at the same time continuing with Post their joint course on Italian Painting. Fitzpatrick, assisted by George H. Edgell (A.B. 1909) undertook Moore's old courses on the Fine Arts of the Middle Ages and the Renaissance, and on the History and Principles of Engraving. Forbes offered another on Florentine Painting, and Chase, who had been made Assistant Professor of Classical Archaeology in 1906, was appointed Chairman of the Department and continued to give the course on Ancient Art.

With the year 1910–11 began the changes by which the courses in Architecture and Landscape Architecture were gradually transformed into the Graduate School of Architecture.[1] As a result of these changes several of the courses in free-hand drawing and in theory of design were transferred to the Department of the Fine Arts. At this time, also, in the School of Business Administration a plan was worked out for the training of men for the business of fine printing, and as a part of this plan a course on the History of the Printed Book was given for undergraduates and graduates by William C. Lane (A.B. 1881), the Librarian. After a lapse of several years, this course was revived in 1915 by George P. Winship (A.B. 1893), when he came to Cambridge as Librarian of the Harry Elkins Widener Collection.

With this considerable increase in the offering was included a larger number of 'Courses of Special Study' (the so-called '20' courses) to provide better opportunities for the small number of graduate students, both Harvard and Radcliffe, who came for advanced study. On the other hand, the introduction of the requirement for undergraduates of 'concentration and distribution' made it clearer that many could devote no more than one course to the Fine Arts, and often took none at all, on the ground that they could not decide between ancient art and mediaeval and modern. In 1912–13, therefore, an attempt was made for the first time to cover the whole history of art in one year, — Chase lecturing on Ancient Art during the first half-year, and Pope on Mediaeval and Modern Art during the second. Though such a plan has disadvantages, because of the rapidity with which the development must be traced, the two half-courses thus established have seemed to meet a demand among undergraduates for the most elementary instruction in the History of Art, and they have been continued to the present day. It was in 1912–13, also, that Edgell offered his first independent course, on the Central Italian Painters of the Renaissance, and that Langdon Warner (A.B. 1903) first gave a course on Japanese and Chinese Art.

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[1] See Professor Edgell's chapter in this volume.

The year 1913 was marked by several interesting innovations. Through the interest of friends of the Department C. Howard Walker (A.B. 1890) was engaged to give for the first time a course on Modern Art and its Relations to the Art of Earlier Times, and FitzRoy Carrington, Curator of the Print Department in the Museum of Fine Arts, conducted at Harvard, under the terms of his appointment in the Museum, a course on the History and Principles of Engraving. Post, now Assistant Professor of Greek and of Fine Arts, initiated two courses which have been given at intervals ever since — one on Renaissance Sculpture, the other on the Art and Culture of Spain.

The period from 1909 to 1919 was one of rapid development in the facilities offered for study by the Fogg Museum. One of the first problems to be attacked by Forbes was that of improving the building as a place of exhibition for works of art, and for the conduct of courses. There were extensive alterations and rearrangements of the building in 1912–13. In 1913, also, was organized the association called the Friends of the Fogg Museum. Frankly modelled on the *Amis du Louvre*, this society is made up of several classes of members. Some make an annual subscription for supporting the regular activities of the Museum. Others contribute from time to time for the purchase of important works of art. Together with the committee appointed by the Board of Overseers to visit the Fogg Museum and the Division of the Fine Arts, the Society of Friends of the Fogg has proved of the greatest assistance in every undertaking of the directors of the Museum and the teaching staff. As a result of these activities of the Museum, Forbes soon felt the need of help in conducting its affairs. Mr. Paul J. Sachs (A.B. 1900) who had for several years been a member of the Visiting Committee, had served as its chairman, and had constantly shown his deep interest in the problems of the Museum and the Division, accepted the assistant directorship, and took up his duties in Cambridge in 1915.

Among the many acquisitions of the period from 1909 to 1919 the following are perhaps worthy of special notice: an important collection of Greek vases, terracotta figurines, coins, and other works of minor art, bequeathed by Edward P. Bliss (A.B. 1873); a portrait of Nicholas Triest, Baron d'Auveghem, by Van Dyck; the Building of the Temple, by Pesellino, one of several pictures purchased with funds provided by the Friends of the Fogg; many works of oriental art, especially a large collection of Japanese prints, given by Dr. Ross; and many prints and drawings presented by Mr. Sachs.[1]

Among the objects loaned perhaps the most noteworthy was a large collection of works of Chinese, Japanese, and Korean art which was deposited in the Museum in 1917 by Hervey E. E. Wetzel (A.B. 1911), before his enlistment in the service of the Red Cross. This collection Wetzel himself arranged in a room on the ground floor of the Museum set aside for this purpose. He died in service, and in his will left a considerable part of the collection to the University, as well as the sum of $100,000 'for the purchase of important works of art of rare beauty' — the first large bequest of this sort.

With such constant additions to the permanent collections the problem of continuing to hold special exhibitions became a serious one. Every time such an exhibition was held the pictures normally exhibited in the main gallery had to be taken down and re-hung. But the Directors were so convinced of the value of bringing to Cambridge for longer or shorter periods masterpieces in other collections or in private hands that every year one or more exhibitions were arranged. Among the most important may be noted: a loan exhibition of Ruskin's drawings, in memory of Professor Norton (in 1909, a year after his death);

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[1] A very definite impression of the growth of the collections in one department, at least, can be gained from the catalogue of the collection of mediaeval and renaissance paintings, which was published in 1919. This was prepared by Mr. Forbes and Miss Margaret E. Gilman, Secretary of the Museum, with contributions by Pope and Edgell.

the works of Degas; oil paintings and watercolors by Turner; Italian Primitives; Early Italian engravings, in memory of Francis Bullard, with a catalogue written by Mr. Sachs; Spanish paintings and drawings of great masters from the collection of J. P. Morgan; Dutch paintings from the collection of Henry Goldman; illuminated manuscripts from the Morgan collection; French art from the ninth century to the present.

Meanwhile the range covered by instruction in formal classes had been considerably enlarged. The tendency naturally was towards the establishment of courses covering smaller fields in considerable detail — especially as material to illustrate such courses accumulated in the Fogg Museum. Chase, who was appointed John E. Hudson Professor of Archaeology in 1916, offered at various times special courses in Greek Sculpture and on the Monuments of the Athenian Acropolis. Pope, who was made Professor of Fine Arts in 1919, introduced new courses in Venetian Painting and the History and Principles of Landscape Painting; Post, courses on Renaissance Sculpture; and Edgell, who became Assistant Professor of Fine Arts in 1914, courses on Florentine Painting and Flemish Painting.

During the World War, as in every other department of the University, instruction was considerably curtailed. Many of the staff were naturally called upon for teaching in military sketching and map making, and others were asked to undertake administrative work made necessary by war conditions. By the autumn of 1919, however, these duties came to an end, and the members of the Division and the staff of the Fogg Museum were once more free to devote their attention to the development of the Museum and the scheme of instruction. In 1919 a course on Modern Sculpture was introduced by Post and one on French Painting by Sachs, who the following year offered for the first time a course on German Painting. In 1920, also, the name of Kenneth J. Conant (A.B. 1915), first appears as instructor in two of the courses in architectural design.

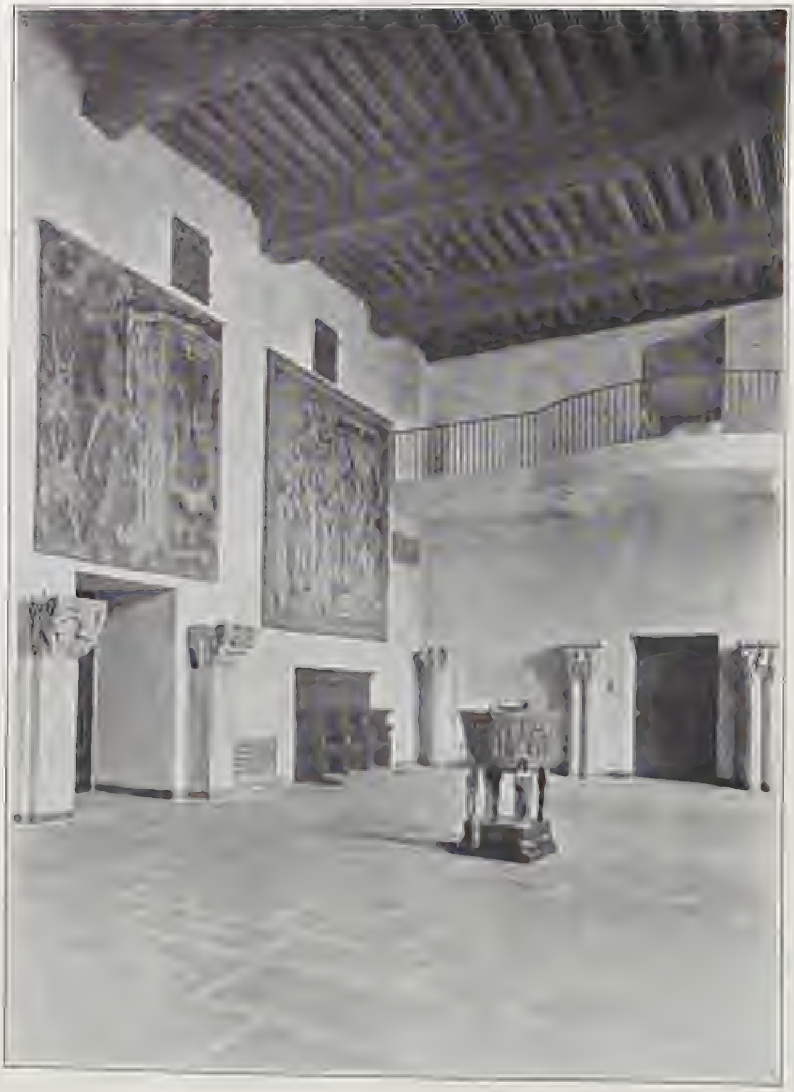
The tutorial system of instruction and a final general examination for all candidates for the Bachelor's degree were adopted by the Division in 1921.

In 1922 two courses 'Primarily for Graduates' were offered, in addition to the 'Courses of Special Study,' which had been given for many years. One on Museum Work and Museum Problems, by Sachs, became a fixed feature of the program of instruction. This course was inspired by the increasing number of men and women who came to Harvard and to Radcliffe for the purpose of fitting themselves to be teachers or curators of museums. Equally significant was the appointment in 1920 of Arthur Kingsley Porter to what was essentially a research professorship. After graduating from Yale in 1904, Porter had spent many years in travel and study abroad, and had become a recognized authority in the history of architecture. He had taught for several years at Yale, but had resigned his position there in 1919. He came to Harvard with the definite understanding that his time was to be free for research, but that he should from time to time offer instruction in such fields as he might choose. To the great satisfaction of his colleagues he has chosen to offer some instruction almost every year since his appointment, at the same time carrying on research and publishing his results; and it need hardly be recorded that association with such a scholar has had a most stimulating effect both on his colleagues and on his students. His first courses were devoted to Mediaeval Sculpture and Romanesque Architecture.

In 1922, Professor Edgell was made Dean of the Graduate School of Architecture, but arranged his duties so that he was able to continue his teaching in the Division of the Fine Arts, giving each year the general introductory course on Mediaeval and Modern Art (which he had taken over from Professor Pope when the development of the instruction in drawing and painting demanded all Pope's time) and a more advanced course on some phase of Italian painting.

The year 1923–24 witnessed another type of experiment, namely, an exchange of instructors with Princeton University. Our relations with the Department of Art and Archaeology at Princeton had always been cordial, and in 1922 was organized the Harvard-Princeton Fine Arts Club, made up of instructors and graduate students in the two institutions. Formal meetings have been held at irregular intervals, and the Club early made itself responsible for the publication of 'Art Studies,' an annual devoted to post-classical art, of which the first number was issued in 1923 by the Harvard University Press and which has recently, in 1927, been given an adequate endowment by Arthur Sachs of the Class of 1901. In an endeavor to pursue still further the policy of coöperation, it was arranged that during the year 1923–24 Professor Charles R. Morey of Princeton should lec-

CHARLES ELIOT NORTON



GREAT HALL OF THE NEW FOGG MUSEUM

ture in Cambridge, and Professor Post at Princeton. Morey, therefore, gave in the first half-year for undergraduates and graduates a course on The Evolution of Mediaeval Style, and for graduates a course on Mediaeval Illuminated Manuscripts Prior to the Twelfth Century. In this year Porter lectured on Byzantine Art.

The most recent developments have been in the direction of providing more advanced instruction for a rapidly increasing number of students, both undergraduate and graduate. Among the new courses introduced since 1924 are: Ancient Painting, by Chase; General Theory of Representation and Design, by Pope; The Mediaeval Book, by Porter in collaboration with E. K. Rand; and Post-Renaissance Architecture in France and Italy, by Leonard Opdycke (A.B. 1917).

Another means of increasing the range of instruction which has been made possible by the generosity of friends of the Division is the bringing to Cambridge every year of distinguished foreign scholars. Since 1925 Mr. Puig i Cadafalch of Barcelona has lectured on the Romanesque art of Catalonia; Professor Charles Diehl of Paris, on Byzantine art; Professor Adolph Goldschmidt of Berlin has given a seminary on German sculpture of the Middle Ages and of the Renaissance and lectured on Dutch painting of the seventeenth century. In 1927–28, also, Professor Eric R. D. Maclagan, who was spending the year in Cambridge as Charles Eliot Norton Professor of Poetry, offered a very welcome course on the technique and aims of Italian sculpture.

3. Research, Exploration, and the New Fogg Art Museum, 1919–1929

If the rapid development of the scheme of instruction since 1919 is noteworthy, the story of the activities of the Fogg Museum is even more impressive. The annual reports of the Director reflect the steadily increasing number of Friends of the Fogg and other benefactors in their lengthening lists of acquisitions: to mention only a few, paintings by Fra Angelico, Simone Martini, Guido da Siena, Botticelli, and Gainsborough; seventeen French Romanesque capitals; a collection of Greek vases, terracottas, and Etruscan jewelry, together with a working library for classical archaeology, the bequest of Joseph Clark Hoppin (A.B.

1893); the Edward B. Bruce Collection of Early Chinese Paintings on Silk, given by Galen L. Stone; and a remarkably preserved Head of a Greek Athlete of the Fourth Century B.C. Special mention should be made of the generosity of Dr. Ross, who every year has added materially to his gifts, especially to the collection of Far Eastern art, which under his guidance has become increasingly significant and useful. He also arranged on the first floor of the Museum, in what had originally been a part of the large lecture room, an exhibition illustrative of the theory of design. In recognition of these many services Dr. Ross was appointed in 1922 Keeper of the Study Series and Honorary Fellow of the Fogg Art Museum.

In 1922, also, the Directors were enabled to realize one of their dreams, namely, the undertaking of archaeological research. This was made possible by an anonymous gift of $50,000 for exploration in Greek lands, and of a fund for similar work in the Far East. Dr. Hetty Goldman, who had received the degree of PH.D. in Classical Archaeology from Radcliffe in 1916, and had already had considerable experience in excavation, was appointed Fellow of the Fogg Museum for Research in Greece, and, in collaboration with the American School of Classical Studies at Athens, began excavations on the site of ancient Colophon in Asia Minor. When unsettled political conditions made it impossible to continue work in this region Dr. Goldman transferred her activities to an important prehistoric site at Eutresis in Boeotia.[1] In 1922 Langdon Warner was appointed Fellow of the Fogg Museum for Research in Asia, and was sent on an exploring expedition to Western China. Working along the great western trade route, the members of the expedition discovered numerous remains of early Chinese sculpture and painting which had not been seen by earlier expeditions, and enriched the collections at the Museum by many photographs and rubbings, as well as by important original works of painting and sculpture. In the spring of 1925, another expedition was dispatched to the famous caves of Tun Huang for the purpose of obtaining complete records of the early sculptures and frescoes in the caves, of which only incomplete accounts were available. The members of this party unfortunately were allowed to work only three days at Tun Huang and so did not accomplish their major purpose, but they succeeded in obtaining records of several other caves. Altogether five early Buddhist sites which had not been previously recorded were carefully studied. In 1927, through the generosity of two supporters, the Fogg Museum joined the Semitic Museum in financing an expedition at Kirkuk in ancient Babylonia under the direction of Professor Edward Chiera, Director of the American School of Oriental Research at Bagdad.

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[1] The exploration of Eutresis was completed in 1927. See Special Number of *Fogg Museum Notes*, Vol. ii (September, 1927).

One other development in the work of the Museum deserves special mention. In the year 1925 Alan Burroughs (A.B. 1920) of the Minneapolis Museum was studying pictures by means of the X-ray. When he wished to come to the East to continue these studies, Mr. Whiting, the Director of the Cleveland Museum, to whom he applied, very generously referred him to the Fogg Museum because he knew of Forbes's interest in the methods and processes of painting. Forbes obtained a grant from the Milton Fund for Scientific Research and took advantage of the opportunity given to him by Mr. Whiting. Mr. Burroughs, associated with Mr. Bohn of the Physics Department, spent the summer of 1925 in preliminary investigations and experiments which proved to be of so much interest that Mr. Burroughs later became a member of the staff of the Fogg Art Museum. He has since taken X-ray shadowgraphs of many pictures in the most important museums in the United States, as well as in the Louvre, the Kaiser Friedrich Museum, the National Gallery, and some of the principal museums and churches in Belgium. Thus the Fogg Museum has gathered together a collection of X-ray shadowgraphs of pictures which is unequalled anywhere in the world. The X-ray is valuable in detecting certain types of forgeries, and it often reveals the condition of a repainted picture so that the restorer can attack it with practical certainty of what he will find under the repainting. It is also expected that it will be possible to identify the work of masters by means of this new weapon.

With all these new activities the inadequacy of the Fogg Museum was more and more impressed upon the directors and the teaching staff; and when in 1923–25 two million dollars was raised as part of the so-called drive 'to extend the national service of the University' another long-cherished plan became an actuality. The leaders in the enterprise were naturally Forbes and Sachs, but all the members of the Division had a share in the campaign. The new building was designed by Charles Coolidge (A.B. 1881) in coöperation with Meyrick R. Rogers (A.B. 1916, M. ARCH. 1919). As a member for several years of the staff of the Metropolitan Museum Rogers had made a special study of museum planning, and his knowledge of the problems of arrangement, of lighting, and other special features of museum construction proved of the utmost value.

By the fall of 1926 the construction was so far completed that the work of moving some of the collections could be begun. This threw so much additional work upon the Directors that in April, 1926, Mr. Walter H. Siple (S.B. 1915) was appointed Assistant to the Directors, and took over much of the routine work of the Directors' office. In connection with the construction of the new building old friends again showed their interest and loyalty. Dr. James Loeb gave a niche of Italian travertine (the material of the central court of the Museum) to hold the bust of Professor Norton which he had presented in 1907. Mrs. Morris Loeb gave ten thousand dollars for the purchase of furniture. A member of the Visiting Committee gave five thousand dollars to develop a garden on the grounds.

The formal opening took place on June 21, 1927, in the large central court. Professor Grandgent read a poem which he had written for the occasion, and the Harvard Glee Club sang under the direction of Professor Davison. The court where the ceremony was held proved to be remarkably well adapted to music, and the occasion served to emphasize the *rapprochement* between the Fine Arts, Music, and Literature, which has been a marked development of recent years in the University. Students of these subjects have frequently joined in arranging lectures and other meetings to their mutual advantage.

To mark the opening of the new building the directors arranged a more comprehensive loan exhibition than they had before attempted, including, in addition to the College silver and a collection of Maya art from the Peabody Museum, illuminated manuscripts, paintings, drawings, tapestries, furniture, ivories, enamels, and other objects. It was feared that when these were taken away the exhibition rooms would look somewhat bare, but this fear proved unfounded. Several of the lenders were willing to leave for a longer period the works which they had loaned, and it soon became evident that in its permanent collections the Museum possesses quite enough objects of good quality to fill the exhibition rooms satisfactorily, and to provide for frequent changes.

The question whether the new building would prove successful in use still remained to be determined, and the members of the Division looked forward with interest to the fall of 1927, when all the work would be conducted there. Such fears as were entertained were quickly dispelled. Lecture rooms proved adequate, comfortable, and (what is most important) acoustically perfect; the rooms for drawing and painting lent themselves excellently to the purposes for which they were designed; Forbes rejoiced in an adequate laboratory for his experiments with the processes of painting and the X-ray; the library proved a delightful working place, especially after the transference from the Widener Library of the books most needed by the students of the Fine Arts; and the instructors rejoiced in their comfortable, well-furnished offices. The new building, to be sure, proved more expensive to build and maintain than had been anticipated, and the Directors still found it necessary to raise considerable sums for immediate use; but this difficulty will undoubtedly be overcome in the near future.

No one certainly can look back over the history of instruction in the Fine Arts at Harvard without a feeling of high hope for the future. Through the courses offered to undergraduates Norton and his successors have markedly influenced the appreciation of the fine arts in America; through graduate instruction much has been done to train teachers for universities and curators for museums; and in the preliminary training of architects, sculptors, painters, and other artists, the group of Harvard teachers has played a notable part. More and more the service of the Division and the Fogg Museum has become distinctly national.

Much more, of course, remains to be done. Although the Fogg Museum has a considerable collection of works of oriental art, and the Museum of Fine Arts in Boston contains one of the great oriental collections of the world, little teaching has yet been done here in this field. Courses in the theory and practice of sculpture ought to be developed, parallel with those in painting and architecture. Those who look forward to a graduate school of sculpture and painting may yet see their hopes realized.

VI. THE GERMANIC MUSEUM

1903–1928

By Kuno Francke, Litt.D.

Professor of the History of German Culture, Emeritus, and Honorary Curator of the Museum

AN OFFICIAL account of the beginnings of the Germanic Museum was given in 1910 by President Eliot when he contributed to a second edition of Faust's German Element in the United States[1] the following statement:

> The conception of the Germanic Museum was formed in the mind of Professor Kuno Francke, who before his first appointment in Harvard University in 1884 had been a contributor to the great work entitled *Monumenta Germaniae Historica.* Not long after Dr. Francke's appointment in 1896 to a full Professorship of German Literature, he brought together under the name of the Harvard Germanic Museum Association a moderate number of gentlemen, interested in German literature and history, who agreed that they would promote the creation of such a museum at Harvard University; and with their aid he succeeded in raising a small amount of money for the purchase of specimens of German art.
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> The first expression of interest in this subject on the part of any German authority was made in March, 1899, by Dr. von Holleben, then German Ambassador at Washington, at a private meeting in Cambridge, in which he expressed sympathy with the Museum undertaking in the presence of several members of the German Department and of the Committee appointed by the Harvard Board of Overseers to visit that Department.
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> Early in 1900 Professor Francke, at that time Chairman of the Department of Germanic Languages and Literatures, engaged in a correspondence with Professor Herman Grimm of Berlin University, suggesting that efforts be made by him to induce the Prussian Government to give to the embryo Germanic Museum at Harvard certain plaster casts of mediaeval German sculptures contained in Prussian museums.[2] Professor Grimm embraced this idea, and interested Count von Bülow, the Imperial Chancellor, in the subject. As a consequence, Professor Francke received at the beginning of 1901 through the German Embassy at Washington an invitation from the German

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[1] Owing to circumstances connected with the World War, this edition did not appear until 1927. President Eliot's account is printed in Vol. ii, pp. 686–687.

[2] It would have been more correct to say 'contained in German cathedrals.' K. F.

Government to make formal application for such a gift. In 1902 a great gift from the German Emperor of casts brought together and transported to Cambridge under the direction of Dr. Richard Schöne, Director General of the Prussian Museums, reached Cambridge, and was set up in accordance with the complete directions he provided. Prince Henry of Prussia brought the illustrated catalogue[1] of the Emperor's gift to Cambridge in March, 1902, and made formal presentation to the University of this unique collection on the sixth of that month. Dr. Althoff, Government Commissioner of the Prussian Universities, and Dr. Julius Lessing, Director of the Royal Museum of Arts and Crafts at Berlin, had become strongly interested in the undertaking. In this year, 1902, Professor Kuno Francke was appointed Curator of the Germanic Museum.

At the formal opening of the Germanic Museum, November, 1903, the University received an address from a committee of twenty-five eminent German citizens — government officials, artists, scholars, and business men — presenting to the Museum a large collection of galvano-plastic reproductions of German metal work from the twelfth to the eighteenth century, together with an admirable illustrated catalogue of these reproductions. At the same time was announced a gift from Professor Archibald C. Coolidge to the Harvard University Library of ten thousand books, to be called the Hohenzollern Collection. From this time forward, in every year additions from many different sources, German, Swiss, and American, have been made to the collections of the Germanic Museum, partly through money gifts, and partly objects of art.

During the nearly twenty years which have elapsed since this account by President Eliot was written, the Museum has progressed chiefly in three directions: first, in being put on a self-supporting financial basis; second, in being housed appropriately; third, in being made an effective part of university instruction.

The first step toward financial self-support was taken when, on the occasion of the twenty-fifth anniversary of Emperor William's reign in 1906, a fund of $25,000 to be designated as the Emperor William Fund, was collected by American friends of the Museum for defraying the current expenses of the collection, then very inadequately housed in the Rogers Building, popularly known as the Old Gymnasium. To this was added in 1909 the sum of $10,000, given by Charles Frohman of New York, as proceeds of an open-air stadium performance of Schiller's *Jungfrau von Orleans*, arranged by him, with Maude Adams in the title rôle. When in the following year Adolphus Busch of St. Louis made an unrestricted gift to the Museum of $100,000, the Corporation set aside half this sum for endowment purposes. In 1914, through a bequest by Hugo Reisinger of New York, another $50,000 was added to the endowment fund.

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[1] More correctly 'a photographic album.' K. F.

For making possible the erection of a new and adequate building we are indebted solely to the liberality of Mr. and Mrs. Busch, whose donations, made in a number of successive years, ultimately reached the sum of $265,000. It was therefore fitting that when this building finally was accomplished the Corporation should have decided to name it Adolphus Busch Hall. For the designing of this building we were fortunate in obtaining the services of one of the foremost living German architects, Professor German Bestelmeyer, now president of the Munich Academy of Fine Arts. As the working plans arrived only in August, 1914, immediately after the outbreak of war in Europe, the actual construction had to be placed in the hands of a resident architect. Professor H. Langford Warren, then Dean of our own Faculty of Architecture, to whom this task was entrusted, performed it with remarkable devotion and skill, carefully adhering to all the essential features of Professor Bestelmeyer's drawings and at the same time adapting their details to local conditions and exigencies. Ground having been broken in the summer of 1914, the building was practically finished in 1917, so that during the remainder of the war the installation of the collection, including a tinting of all the casts in the colors of the originals, could be brought about. In the spring of 1921 the Museum was reopened to the public; and although post-war conditions made it seem advisable not to emphasize publicity, more than fifty thousand visitors were recorded within the succeeding year.

As the building now stands, a typical representative of the modern Munich school of architecture, it suggests both in exterior and interior the characteristic features of the Romanesque, Gothic, and Renaissance periods, and thus permits the installation of most objects within their own historical setting; transporting the visitor, to some extent at least, into the correct atmosphere. A lecture room in the top story provides for instruction with lantern slides, and a library stack gives opportunity for independent study of special topics in the history of Germanic culture.

The most important part of the whole undertaking, the connection of the Museum with historical and artistic instruction, is still a problem only partially solved. Originally, the Museum was conceived of on a much larger scale. It was meant to offer illustrative material for the whole development of Germanic culture from the first contact of Germanic tribes with the civilization of the Roman Empire to the nineteenth century. Through limitations of money and of space, the collection has gradually come to be restricted to German art from the Carolingian epoch to the present day, with especial emphasis upon sculpture: a restriction natural and justified because it is possible within this field to obtain outstanding examples in full-size casts. The result has been that for German sculpture of the Middle Ages and the Baroque and Classicist periods, we already have a collection of casts such as no other museum possesses, with sufficient means to fill out gaps and thus to make it in time a complete conspectus of the best that German genius has produced in this domain. What has been and is still lacking is the activity of a trained historian of art, capable of interpreting this whole mass of material and of presenting it to the student mind in close connection with other manifestations of national culture, especially in literature.

Sporadic efforts in this direction have been made. As Professor of the History of German Culture, Francke gave from 1906 to 1917 a number of courses on Mediaeval German Sculpture, on German Mysticism of the Fourteenth Century, on the Mediaeval German Drama, on Flemish and German Religious Painting of the Fifteenth Century, on the German Romantic Movement. In the winter of 1907 Professor Paul Clemen of Bonn University, as German Exchange Professor, held a seminary in the Museum on selected masterpieces of German sculpture. In the first semester of the academic year of 1927–28 Professor Adolph Goldschmidt of the University of Berlin, as visiting Germanic Museum Lecturer, conducted a seminary, interpreting in detail our whole collection of mediaeval casts, and bringing out the relation between German, Byzantine, and especially French mediaeval art. But not until a permanently endowed full professorship of the history of German art and culture has been established, will the real function of the Museum, as the centre of a systematic and comprehensive study of German artistic and spiritual achievements, have been fulfilled.

VII. HISTORY

1838–1929

By Ephraim Emerton, Ph.D.
Winn Professor of Ecclesiastical History, Emeritus
and the Editor[1]

I

THE development of a Department of History in Harvard University forms a close parallel with the expansion and systematization of historical studies throughout the civilized world. Down to about the middle of the nineteenth century history was written, studied, and taught largely as a form of literature. History was the 'handmaid' of philology, of philosophy, of politics, of economic or social reform, according to the special interest of the moment. The great historians were also great literary figures. Chairs of history in European universities were not infrequently filled by distinguished men of letters, whose knowledge of their subject was only such as furnished material for poetic or dramatic expression.

Under these conditions there was no place in academic programmes for history as a separate discipline. A knowledge of history was by the way as an adjunct of other studies. Historical method as such was not formulated in any specific fashion. One learned history by reading the classic historians and remembering as much of their contents as might be. The natural attitude of the reader was one of passive receptivity. He accepted as an axiom that what was in the book was there in virtue of some intrinsic quality of veracity. It was not for him to question its essential accuracy — still less to do over again the work of analysis of material which, presumably, had been done already once for all. The study of history was rather an elegant accomplishment than a serious pursuit leading to a professional career.

It was a rude shock to this complacent attitude when the modern spirit of criticism, active in every field of human endeavor, began to occupy itself with the historical record. Then was heard that eager questioning of all narrative writing which has been going on ever since and has brought about a complete transformation in our thought about history and in our methods of pursuing its study. The causes of this new departure were mainly two. The first was the extraordinary impulse given to every form of human activity by the new scientific method which dates from the creative work of Charles Darwin and his immediate successors. This scientific method was essentially an historical one. Its votaries were concerned, above all else, with tracing back, ever farther and farther, the origins of those forms of life which had hitherto been conceived of as fundamentally static and permanent.

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[1] The editor is responsible for sections 3 and 4, and for descriptions of persons subsequent to Henry Adams. Professor George Foot Moore contributed data on the History of Religions, and Professor Edward A. Whitney, data on History and Literature.

These studies, inevitably including mankind as one among the infinite variety of created things, could not fail to react upon Man as a social being, the proper subject of all historical inquiry. As the more technically scientific subjects became more completely differentiated one from the other, they were worked out into separate departments of academic study, and wholesome rivalries among them for recognition and support formed a considerable part of the story of academic growth.

Precisely the same thing happened at the same time with the study of history. It began to be differentiated from those other 'humane' pursuits with which it had been so closely associated. It too began to fight for its life as an honored member in the academic family. It claimed for itself a material capable of precise definition and a method as purely scientific as those of the contemporary physical sciences.

The second stimulating impulse to modern historical scholarship was the acute sense of nationality which in the nineteenth century became the driving force of European politics, and has so continued to the present day. As a potent agency in this national movement historical studies began to receive unprecedented attention; especially in Germany. Here even in the midst of the Napoleonic tyranny the Freiherr von Stein conceived the *Monumenta Germaniae Historica* as a means of bringing the German people as a whole to a realization of their past greatness, and of giving their racial and cultural unity a political expression. Chairs of history were established in every German university, and were filled by men such as Georg Waitz and Johann Gustav Droysen, who had gained their preliminary training largely through philological study. These men and their pupils were indefatigable in collecting and publishing materials, in the critical editing of texts, and in the writing of history from the sources.

The importance of this German movement was not due to any novelty in the basic idea. Long before, Italy had had her Muratori, and the Church her Bollandists. What gave the German contribution its special significance was the systematic method of presentation to the world of scholarship. The result was the creation of a science of historical research and criticism, clearly differentiated from other sciences, but pursued in the scientific spirit and taught by a sound pedagogic process.

It was not until 1870 that this European movement in historical science obtained a foothold at Harvard; although there was a false dawn in 1838 when the McLean Professorship of Ancient and Modern History was established. Harvard College, to be sure, had always been a mother of historians, beginning with William Hubbard of the Class of 1642, and including Thomas Hutchinson (1727), Jeremy Belknap (1762), William H. Prescott (1814), George Bancroft (1817), John Lothrop Motley (1831), Francis Parkman (1844), and John Fiske (1863). Yet whatever Harvard did for these men, she did not instruct them in history. The ancient historians had always been read in the College as classics; Church History was studied in the Divinity School, but of modern history there was, before 1838, only a brief series of weekly recitations from a wretched manual called Tytler's Elements of General History (Edinburgh, 1801); and in American history, only a few recitations on the Constitution, using The Federalist, and, occasionally, Story's Commentaries.

Jared Sparks (A.B. 1815), appointed McLean Professor in 1838, was probably the first professor of civil history in any American university. In the conditions he laid down for accepting the chair, Sparks showed prophetic insight into the form that history teaching was to assume in the future. He proposed to discard recitations and textbooks; to instruct by lectures, prescribed private reading, and the writing of historical essays; that he should not 'be called upon to instruct in any other branch than that of history'; and he insisted that the remainder of his time should be spent in his own researches. Shortly after his appointment, Sparks organized a Department of History

(1839),[1] and with a succession of young graduates with no special training, recitations on such works as Keightley's Rome and Smyth's Lectures in Modern History were required of Sophomores and Juniors, while Sparks gave public lectures on American History for the Seniors.

The period thus promisingly begun ended in 1849 when Sparks became President of the University. The McLean chair remained vacant seven years. History was reduced to recitations on Ancient History (for Freshmen) and on the Introduction to Robertson's Charles V (for Sophomores), under a single tutor who had other duties as well. American History, and lectures, disappeared.

A gleam of light returned to this gloom in 1856 when Henry W. Torrey (A.B. 1833) was called to the McLean chair from the headship of a girls' school in Boston.[2] Torrey had no historical training, had written no books, and did not lecture; but he was a born teacher, and succeeded in impressing some of his students with a sense of the meaning and importance of history. He insisted on a knowledge of historical geography, and set a type of examination unusual for his period with 'essay' or 'discussion' questions, and quotations intended to draw out the students' ideas. Torrey was much beloved, and toward the new generation of German seminary-trained scholars his attitude was benevolent and encouraging.

Ephraim W. Gurney (A.B. 1852), who had previously taught Latin and Intellectual Philosophy, was appointed in 1868 Assistant Professor of History; and the next year, on the accession of President Eliot, was promoted. Gurney was a worthy representative of the period when history was considered a subject which any educated gentleman was qualified to teach. He wrote little, save articles for his friend Godkin of The Nation; he introduced no innovations in method, and was not noted as a teacher; but he was a man of the world with an eye for men, and he had the singular honor to be elected Fellow of Harvard College while still in active teaching.[1]

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[1] No one seems to remember when the Department first held meetings. Existing records begin in May, 1891, after the administrative reorganization of that date (see Introduction), and under the title 'Department of History and Roman Law.' This title was changed to 'Department of History and Government' in 1895. Government split off in 1910, leaving a 'Department of History' once more.

[2] Torrey had been Tutor in History and Political Economy, 1846–48; and even at that time insisted on a knowledge of historical geography in his lecture courses. He was the author of an English-Latin lexicon, and a printed *Lecture on the Uses of History* (1868).

Gurney's outstanding ability, as President Eliot soon discovered, was in administration; and it was in order to give himself time for his duties as Dean of the Faculty that he suggested an appointment which began a new era for history at Harvard. The name of this new assistant professor was Henry Adams.

The story of his seven years' experiment in imparting rather than seeking instruction is told in a chapter of The Education of Henry Adams characteristically entitled 'Failure.' It will bear repetition how Adams, at Wenlock Abbey, received a letter from President Eliot inviting him to take the new assistant professorship in Mediaeval History. 'But Adams knew nothing about history, and much less about teaching, while he knew more than enough about Harvard College; and wrote at once to thank President Eliot, with much regret that the honor should be above his powers. His mind was full of other matters.' Yet, on his arrival home in September, friends, family, and Professor Gurney urged him to accept. Adams went out to Cambridge and had a few words with Eliot, who renewed the invitation. '"But, Mr. President," urged Adams, "I know nothing about mediaeval history." With the courteous manner and bland smile so familiar to the next generation of Americans, Mr. Eliot mildly but firmly replied, "If you will point out to me any one who knows more, Mr. Adams, I will appoint him."'

It was true that Henry Adams had no 'equipment' save a year's desultory schooling at Berlin twelve years before; and that 'he exhausted all his strength in trying to keep one day ahead of his duties';[2] but it was also true that in the year 1870 there was in this country no such thing as an academic profession of history.[3] It was all to be created, and Henry Adams, in spite of his protestations of failure, was, more than any other individual, the creative agent. After a year or two of experiment he began the method which has since become the most efficient, the most widely imitated, and the most harshly criticised contribution to the upbuilding of systematic historical study in America.

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[1] See *Dictionary of American Biography*, and Godkin's memoir in *The Nation*, xliii, 231. The Gurney Professorship of History and Political Science was established in 1908, from a fund received from the estate of Mrs. Gurney, who was a sister of Mrs. Henry Adams.

[2] 'How were the Popes elected in the eleventh century?' asked Emerton '71, in Professor Adams's course. 'Pretty much as it pleased God!' was the reply, in Adams's characteristic and somewhat nasal drawl.

[3] As late as 1884, President Eliot could declare without contradiction, 'The great majority of American colleges . . . have no teacher of history whatever . . . in so old and well-established a college as Dartmouth there is no teacher of history, whether professor, tutor, or temporary instructor; while in so excellent an institution as Princeton there is only one professor of history against three of Greek.' — *Century Magazine*, vi,

The details of this method are amusingly simple: first, the selection of specially interested and specially qualified students; second, the introduction of these students to the original sources of information within a narrow range of study; third, free access of the student to a wide choice of books.

When Adams began his work no one of these items had received adequate attention. The library in Gore Hall under the fostering care of Sibley had come to be a rich storehouse of books, but students were not welcome. The only room in which books could be used served at once as entrance-hall, delivery-room, reading-room, and reference-room. The floor of the lofty main hall with its dimly-lighted alcoves was mainly occupied by locked cabinets for rare books with glass showcases above for manuscript treasures. There is a legend that Adams asked that tables be provided for the use of students and when his request was refused for want of space said to the Librarian, 'If you don't get your old rags out of here by a certain date I will appeal to the Corporation.' At all events, the cases were removed, tables came in their place, and a new era in the history of our department began.[1] The appointment of Justin Winsor (A.B. 1853), himself a distinguished historian, as College Librarian in 1877, meant a systematic application of the new spirit; and the recognition that one of the primary functions of the College Library was to meet the current needs of undergraduates and their teachers.[2]

Adams soon found his chief interest in dealing with a group of

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207. By that time, however, Yale, Cornell, Michigan, Johns Hopkins, and other universities had established chairs of modern history, so that the Harvard department was conscious of strong competition.

[1] In 1889–90 there was opened in Harvard Hall a separate historical library as well as a classical library for the use of large classes. The experiment proved so successful and the need so continuous that when the new Widener building was opened in 1915 a commodious reading-room was provided for the same purpose.

[2] In 1892–94, the period of the Columbian quatercentenary, Winsor offered a graduate course on the Geographical Discovery of America, based on the admirable collection of ancient maps, original and in reproduction, that he had accumulated in the Library.

upperclassmen and graduates, who responded most readily to his effort to interest them in personal, individual, original work; but in all his courses the students were required to take an active part, presenting reports for discussion by their fellows and for the mordant criticism of the master.

The most tangible evidence of Adams's successful work with these young men and the best refutation of his own self-accusation of 'failure' is the volume of Essays in Anglo-Saxon Law prepared by himself and his pupils, Henry Cabot Lodge '71, J. Lawrence Laughlin and Ernest Young, '73, which obtained for them the first Harvard Ph.D.'s in History, and were promptly published. Other members of the group were S. M. Macvane and Freeman Snow, '73, Lindsay Swift '77, Henry Osborn Taylor and Edward Channing, '78. All these men except Laughlin became historians. Indeed, it may be said that apart from Torrey and Gurney, the Department of History was conducted for many years after Adams's departure by his pupils. Channing, one of that group of ardent youngsters who caught their enthusiasm from Adams, retired from active teaching only in 1929.

In his last two years of teaching Adams gave in succession the two courses on American History, divided by the year 1789, which have been Harvard classics ever since. It was his delight to make his pupils fight over again the battles of the period in which his family had played so conspicuous a part; forcing Bostonians of Federalist lineage to support the Jeffersonian position, and those of the Democratic tradition to defend the most abhorred tenets of blue-light Federalism. A further proposal in that direction is embodied in a letter of March 2, 1877, from Adams to President Eliot, urging the establishment of a 'rival course' to his, in the hope 'to stimulate both instructors and students, and to counteract, within its range, the inert atmosphere which now pervades the college.' His choice for rival is Mr. Lodge: 'His views being federalist and conservative, have as good a right to expression in the college as mine, which tend to democracy and radicalism.'

Although the Corporation 'gladly gave its consent' to Mr. Adams's plan 'for increasing the interest in American history,' [1] and appointed the desired rival, Adams persuaded himself that he was a failure, and renewed his quest for an education. Fed-

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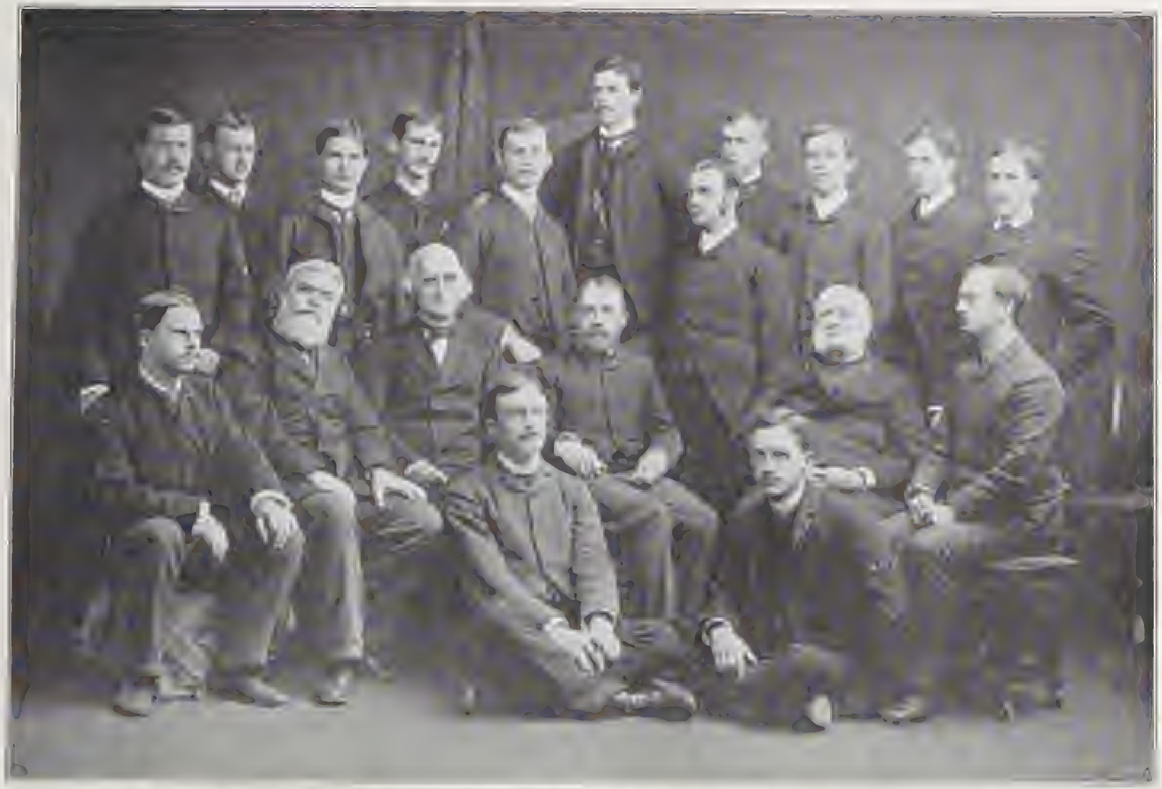
[1] Corporation Records, xii, 251.

HENRY ADAMS



Standing, left to right: C. M. Harrington, J. J. Colony, A. B. Sawyer, S. S. Bartlett, O. R. Hansen, J. R. MacArthur,
E. B. Young, C. F. Carrier, Edward T. Sanford, J. McG. Goodale, Roland Bowden
Seated, left to right: C. C. King, Winsor, Torrey, F. I. Carpenter, Emerton, W. A. Halbert, Ch. Deane, Channing

THE HARVARD HISTORY CLUB

1885

eralism held the field [1] until 1879, when Lodge went back to editing, on his way to the Senate. American History languished until 1883, when Albert Bushnell Hart (A.B. 1880) returned with a Freiburg Ph.D., earned under Von Holst, and Edward Channing with a Harvard doctorate, entered the Department to assist Torrey.

This double event of great portent coincided with a landmark in history teaching in America, the formation of the American Historical Association. Justin Winsor presided over that *constituante* of our profession, the Saratoga Convention of September, 1884; Emerton was elected a member of the first Council; Channing presented the first paper before the Association, and Kuno Francke reported progress on the *Monumenta*. Six presidents of the Association have been officers, and ten others graduates, of Harvard. The American Historical Review may be traced to a vote of the Department of History on November 16, 1892, appointing Hart, Gross, and Emerton a committee to report a plan for an historical journal 'to be published by the department.' The Department considered this too exclusive. Two years later we find Emerton and Hart drafting another plan with a view to coöperation with the history departments of other universities. By friendly conference and correspondence this was combined with a rival scheme that H. Morse Stephens had initiated at Cornell. An informal conference, initiated by the Harvard group, was held at New York in 1895; an editorial board of five, including Hart, was elected; and the first number of the American Historical Review appeared in October.[2]

In the meantime, a stream of ambitious American youth was pouring over to Germany in search of historical training, and returning to seek appointments. What Germany offered students of history at that period (1873–93) was precisely what America lacked: teaching by men of the highest rank as scholars — teaching not merely by lectures to large classes, but by personal conference with small groups — the so-called 'seminary method.' Only one who is old enough to have had personal experience of this method at that time can realize the immense stimulation to an eager youth familiar only with the dreary routine of an American recitation-room at finding himself day after day, face to face with scholars like Leopold von Ranke, Theodor Mommsen, Johann Gustav Droysen, Heinrich von Sybel, and Wilhelm von Giesebrecht; to be privileged to sit down with them around the seminary table and be initiated by them into the processes of research and interpretation by which they had made their classic contributions to the history of mankind. The second thing which the American student found in Germany was organization and systematization — too much of it for the comfort of daily life, but just what we needed here to tie up our scattered threads of experiment into an efficient working system.

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[1] Channing, who missed Adams's course in American History but took Lodge's, declared that Lodge and Hildreth's *History* combined to make him, by reaction, a Jeffersonian. The editor's father, however, was more receptive, and bequeathed the Federalist tradition, with his set of Hildreth, to his son.

[2] J. F. Jameson, in *American Historical Review*, xxvi, 1–6; records of the Department.

Returning to America from 1876 onward, with a fresh gospel of accuracy, thoroughness, and fair-mindedness, these young men were received with varying degrees of appreciation according to the spirit of the institution they sought. The Johns Hopkins University, founded in 1876 as a Graduate School of Arts and Sciences, was especially receptive to the new impulse. Other colleges and universities looked with a certain suspicion and even with alarm upon innovations which threatened to disturb their academic repose. At Harvard the influence of Henry Adams, supported by the far-seeing energy and courage of Eliot and the wise counsel of Gurney, had prepared the way for radical changes of method and for novel and disconcerting ideas of academic discipline.

Ephraim Emerton (A.B. 1871, PH.D. Leipzig 1876) was the first of these *Herren Doktoren* in history to return to Harvard, and the first to obtain an appropriate chair: the Winn Professorship of Ecclesiastical History. Church History had long commanded at Harvard a degree of respect not accorded to its secular rival. It had been taught by the Rev. Charles Follen and the Rev. Henry Ware in the Divinity School, where the Rev. James Freeman Clarke also gave instruction in The History of Religions and Comparative Theology, 1867–71.[1] But the Winn chair was created for the University in the hope that the history of the Christian Church, treated not by a minister as a subject separate from 'Civil History' but by a trained layman as a part of the general history of mankind, might be profitable to other than divinity students. Emerton had been giving Roman and Mediaeval History in the College since 1876; he now (1882) shifted his attention to the Rise of the Papacy and the Renaissance and Reformation (History 7), a course that he gave steadily until 1918, and which still remains a favorite both for undergraduates and graduates.[1] Emerton wrote textbooks but seldom used them himself; he disliked prescribed reading, and delivered an early and much needed warning against the abuse of the lecture system.[2] His own lectures tactfully guided students to the best literature on the subject of their study. Emerton was almost alone in the Department in emphasizing the cultural aspects of history; but this modest, gentle, and erudite scholar has lived to find his favorite *Kulturgeschichte*, under the title of Social History, again in fashion.[3]

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[1] Lectures published as *Ten Great Religions, An Essay on Comparative Theology* (1871), a pioneer book in that field.

Institutional History was uppermost at Harvard in the last third of the nineteenth century. Maine and Stubbs in England, Waitz in Germany, Fustel de Coulanges in France, initiated an eager search into the origins and development of political institutions, believing therein to find the true explanation of human progress. Henry Adams introduced the fashion to Harvard. To take a sample year, 1890–91, there was hardly a history course in the catalogue, save History 1 and those given by Emerton, which did not smack of *Verfassungsgeschichte*. There was Constitutional Government (later Government 1), Constitutional History of England since George I, and Principles of Constitutional Law, by Professor Macvane; English Constitutional History from 1485 to George I, and Early Mediaeval History 'with Special Reference to Institutions,' by Mr. Bendelari; French History to Louis XIV, with the same emphasis, by Dr. Snow; Constitutional History, Constitutional Development, and Federal Government, by Professor Hart; Early American Institutions, by Professor Channing; and three more courses on English Constitutional History, by Dr. Gross. Certainly no university in the United States or England today would offer so much constitutional history. It was a subject of great cultural value when properly taught; and the intensive study of charters, constitutions, and like documents, which Stubbs and his disciples made available, was an admirable training in thoroughness and accuracy.

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[1] Kirsopp Lake (S.T.D. St. Andrews 1911), who succeeded Emerton in the Winn chair in 1919, has confined his college courses largely to the literary interpretation of the Bible.

[2] 'The Practical Method in Higher Historical Instruction,' in G. Stanley Hall's *Pedagogical Library*, i (1884), 31–60.

[3] Professor Emerton's principal works are his *Life of Erasmus* (1899); *Unitarian Thought* (1911); a critical study of Marsiglio's *Defensor Pacis* (1920); *Learning and Living* (1921); *Humanism and Tyranny, Studies in the Italian Trecento* (1925).

Of the professors mentioned in the preceding paragraph, Giorgio Anacleto Corrado Bendelari, a Harvard graduate (A.B. 1874) of Neapolitan birth, was a devoted but not a successful teacher, giving courses on a wide variety of subjects. In 1894 he joined the editorial staff of the New York Sun, and gave it for many years an outstanding literary department. Freeman Snow's premature death in 1894 cut short a promising career as a writer on international law. Silas Marcus Macvane (A.B. 1873) was a Nova Scotian with a slow-working but acute mind. As Instructor in Political Economy he had shown a flash of genius by devising the system of examination groups, which brought order out of chaos in the elective system. College gossip credits to this feat Macvane's elevation to the McLean chair in 1887, which he filled to the dismay of undergraduates for twenty-four years; for Macvane was one of the dullest lecturers that ever addressed a class. His dismal monotonous delivery, broken by periods of prayer-like silence with closed eyes, took all the life out of his students; but the few who had the patience to study with him personally, profited greatly by his cool wisdom. As a tutor Macvane might have become a great teacher; as a professor he was wasted; as a member of the faculty his counsel was highly regarded.

Charles Gross, the first member of the Department not a graduate of Harvard College, was also the first to contribute to the literature of European history. After laying his foundation under such European masters as Pauli, Bresslau, and Monod, he brought to bear upon the vast and then almost unexplored records of the Public Record Office the critical methods of continental scholarship, together with 'qualities of insight, balance, and perfect lucidity of thought and statement which made him an acknowledged master in his profession.' [1] His Göttingen doctoral dissertation on the Gild Merchant demolished prevailing theories and substituted a new one which is still unchallenged; and a generation of coöperative efforts in England and America has yet failed to bring down to our times his monumental critical bibliography of English history. Coming to Harvard as an instructor in 1888, Gross quickly found appreciation among mature students; his course on English Constitutional History (9) attracted a brilliant group of pupils,[1] and became one of our classics. Gross lectured slowly, with great precision, and in so loud and high-pitched a voice that Sidney Fay, sitting comfortably in his window-seat in Hollis, used to take complete notes on Gross's lectures in Harvard Hall! He was the first to require a stiff thesis; and course theses have since become a most valuable part of history instruction, for they give the student an opportunity to make some small question or corner of the field his own. Gross was twice chairman of the Department, and much beloved by his colleagues. 'With all his learning and critical capacity he was a man of unaffected modesty, never pushing himself forward or assuming a tone of superiority. He was without an enemy, and though he had seen more of the shadow than the sunshine of life, he retained a singular sweetness and simplicity of disposition.' [2]

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[1] Memoir by Haskins, in *Proceedings of the Massachusetts Historical Society*, xlix, 162.

As the century waned, institutional and constitutional tags were dropped from the announcements of history courses. This aspect of history was gradually absorbed by the new Department of Government, until only History 9, conducted by Gross's pupil Charles H. McIlwain (A.M. 1903),[3] and one on Mediaeval Institutions conducted by Haskins's pupil Charles H. Taylor (A.M. 1922), remain as relics of the brave days of old. The quality of McIlwain's mind, and of his course, is neatly stated by one of his undergraduate pupils: 'What matters is that the student cannot escape learning how the mind of the scholar works, and can hardly escape acquiring . . . the scholar's attitude of mind.'

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Returning now from content and personalities to programmes and methods, let us note that from the beginning it has been a problem to maintain a just balance between the type of instruction to be offered to the average student and that which would be profitable to the more mature or the specially interested.

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[1] Including Gaillard T. Lapsley (A.B. 1893), Fellow of Trinity College, Cambridge; Howard L. Gray (A.B. 1898), Professor at Bryn Mawr; William A. Morris (PH.D. 1907), Professor at California; and Norman H. Trenholme (A.M. 1897), Professor at Missouri.

[2] Minute adopted by the Department at his death in 1909.

[3] Author of *The High Court of Parliament* (1910), editor of the political works of James I, and of a provocative essay *The American Revolution* (1923).

The Sparks formula of superior instruction by lectures for the mature, and elementary instruction by class and textbook work, had not solved the problem. The next step was to draw a sharp line between prescribed and elective courses; but prescription of every sort was coming to be regarded as a violation of the new gospel of academic freedom.

In 1879–80, all positive prescription in history was abolished [1] and a modified form of Hobson's choice was put in its place. All courses were elective, but before taking the more advanced, one must have taken the more elementary. In other words, compulsion was applied to the order in which the work was to be done, not to the work itself. A student might escape all the history courses; but, if he went into them, he must follow some rational order of progression.

This general principle tried out more than forty years ago has remained fixed through all the changes of programme to this day. No subject has been more persistently debated in the Department than this of the relation between elementary and advanced instruction. Out of the orderly confusion of these debates developed two institutions which we may call permanent, in spite of a constant shifting in details. At the lower end of the scale appears from the year 1879 a course in Mediaeval and Modern European History (History 1) intended as a general introduction to all more detailed study. With many changes of method and of administration this course has continued. It was conducted by Emerton from 1879 to 1882, by Macvane until 1886, by Channing until 1894, by Coolidge until 1903, by Haskins and Merriman, with lectures by other members of the Department, until the present. In a word, the Department has generally given of its best to the beginners, and has been rewarded by attracting large numbers to more advanced courses.

At the other end of the scale one finds in the year 1885–86 a course called History 20: Special Advanced Study and Research. Three years earlier Emerton had begun to announce each year a class for Practice in the Study and Use of Historical Sources, of which History 20 was an outgrowth. Beginning with two or three such 'practice courses' others were gradually added, until nearly every field of historical study had its '20' course in which advanced students were trained in the technical processes of the historical investigator. While many such students were naturally graduates preparing to become teachers by profession, the Department has always maintained that this form of teaching had a value also for the interested and competent undergraduate. It has never drawn with any strictness the fictitious line between graduates and undergraduates, but has based its methods upon the real foundations of individual capacity and enthusiasm for work.

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[1] The last history course prescribed for all undergraduates was 'Sophomore History,' based on Freeman's *Outlines of General History*. From 1874 to 1877 this was given by Ernest Young (A.B. 1873), a pupil of Adams, who remained with the Department until his death in 1888.

The Graduate Department became the Graduate School in 1890,[1] and the next autumn the catalogue broke out in a veritable eruption of eleven History seminaries 'primarily for graduates.' Lack of demand quickly reduced this number to two, of which Gross's on the Sources of English Constitutional History alone proved permanent. The individual '20' courses, however, continued.

As we have seen, doctorates in history had been granted by the University since 1873. By 1902 both the technique of historical training and the collections in the library had been so far perfected that the former stream to Germany was dammed up in Cambridge.[2] Of late years, a returning stream of subsidized English graduate students has put in its appearance; and for twenty years distinguished European historians have been coming as exchange professors or occasional lecturers.

The following table of Harvard doctorates in history and government shows the trend both in numbers and in subjects.

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[1] See Professor Haskins's chapter on the Graduate School of Arts and Sciences, in this volume.

[2] The department has, however, always advised its *doctorandi* to take at least a year in Europe as part of their general process of education, even when not strictly necessary to obtain access to sources. Mrs. Frederick Sheldon established in 1909 a fund of $400,000 for travelling fellowships in memory of her husband (A.B. 1842); of this the history students have always had a large share. There are also available the travelling fellowship established in memory of William Bayard Cutting, Jr. (A.B. 1900), the fellowship for research in historical archives established in 1900 by the Duchess of Arcos in memory of her brother Woodbury Lowery (A.B. 1875), and a number of others for which advanced history students compete with others in the Graduate School. Among these is the John Thornton Kirkland, the oldest travelling fellowship in the University, established in 1871 by George Bancroft in memory of President Kirkland.

Doctoral Dissertations in History and Government, 1873–1928

	1873–1900	1901–19	1920–28	Total
American History:				
United States and Thirteen Colonies[1]	12	15	26	53
Canada	1	..	2	3
Latin America	..	3	2	5
English History:				
Institutional	10	9	4	23
Political	1	7	3	11
Government and International Law	3	7	21	31
Political Theory	..	..	3	3
Mediaeval History[2]	2	5	9	16
Modern Western European History[3]	2	12	8	22
Eastern European and Asiatic History	..	5	4	9
Ancient History	..	2	3	5
Economic History[4]	..	2	1	3
Total	31	67	86	184

Of these 184 holders of Doctor's degrees in History or Government the greater part have made the teaching of history their life work, and some sixty different colleges and universities have called Harvard doctors to their chairs of history. It should be said that the Department itself has never made a fetich of the Ph.D. One of its most valued members, the late Professor Johnston, had only a bachelor's degree. Evidence of productive scholarship is, however, required for promotion, whether of tutors or lecturers, on the principle that only a genius can escape sterility in teaching unaccompanied by creative work.

Neither the Department nor the Graduate School has ever required publication of doctoral dissertations. It is significant, however, that all but a small minority of the history dissertations have in whole or in part eventually found their way into print — sometimes, as in the case of Conyers Read's Life of Walsingham, after additional labors extending over a score of years. A limited but much valued resource for publication is

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1. Including diplomatic history.
2. Not including subjects in English history, most of which were mediaeval.
3. Including diplomatic subjects that touched England.
4. Not including dissertations in Economic History administered by the Department of Economics, or subjects in American Economic history.

the Harvard Historical Series, of which thirty volumes have appeared since 1894.[1]

Only those who have experienced it can realize the extraordinary stimulation which came to the whole generation of younger Harvard scholars between 1870 and 1900 from the mere fact that the organization of departments was as loose as it could well be consistently with a reasonable community of effort. Heads of departments, in the sense in which that phrase was used in some other institutions, were unknown. Seniority carried with it naturally a certain weight of influence and of respect, but not even the pretense of authority. One cannot imagine Torrey or Gurney dictating to their younger colleagues how they should teach or what manner of discipline they should practise. The effect of this liberal attitude was not to repel but to attract the younger men to seek the advice and approval of their seniors, and to work in harmony with them. There were no subordinates in the History Department. 'Assistant professor' did not mean assistant to a professor, but a man who had been accepted as a probable candidate for further promotion. Every young teacher was encouraged to offer new courses in competition with his elders, to publish freely the results of his scholarship, and to associate himself with colleagues throughout the country.

There was something in the atmosphere of Cambridge and Boston favorable to the study and writing of history. Near to the College resided eminent historians such as Charles Deane, John C. Ropes, John Fiske, William Roscoe Thayer, Charles Francis Adams, James Ford Rhodes, Worthington C. Ford, whose friendship and acquaintance was of great value to members of the Department, and who could be counted upon for occasional lectures or informal talks before the History Club. That club of students was formed as early as 1885, and has continued to this day; at times there have also been smaller history clubs, such as the Star Chamber and the Henry Adams, composed of graduate students with common historical interests.

Two ordinary courses and a research course early became the usual offering for each member of the Department on full salary, although the more energetic or amiable members sometimes offered more. The content of those courses was determined largely by precedent, personal preference, and, in the last instance, by student demand. Little attempt was made until the coming of the divisional examinations to provide a well-rounded programme. If a course on French mediaeval history, for instance, became established, the Department attempted to keep it going when the instructor resigned or died; but the new incumbent was almost always invited to select the subject of his second course; and unless that new course, after several years' trial, failed to attract students, it too continued. In such manner, for instance, began the quasi-school of Near-Eastern History within the Department.

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[1] This series is supported by a revolving fund created by a gift of $10,000 by William M. Prichard (A.B. 1833), in 1900, in memory of Professor Torrey. A committee of the Department selects the manuscripts for publication, and sees them through the press.

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One day in the spring of 1893 President Eliot summoned Professor Channing, and inquired whether he could find something to do in the History Department for a member of the class of 1887 who succeeded in taking a Ph.D. at Freiburg while in the diplomatic service. The young man was Archibald Cary Coolidge. He was given charge of a special section in History 1, for men who had no classical background, and conducted it so well that Channing relinquished History 1 to him altogether in 1894. For his second course, Coolidge offered the History of Northern and Eastern Europe from 1453 to 1795 (History 15); alternating with the History of the Eastern Question (History 19),[1] courses which, during the quarter century that Coolidge gave them, began the training of a galaxy of pupils.[2]

Coolidge was a man of wide contacts and many talents. As a bachelor he lived among the undergraduates and induced many to enter the public service; yet as a teacher of graduate students no one was more thorough, exacting, or inspiring. Many other departments of the University profited by his generosity and his worldly wisdom. After relinquishing History 1 to Haskins in

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[1] History 19 was the first course offered here on Contemporary History; and when Coolidge gave it for the last time, in 1926–27, the year 1896, when he first gave it, had become the median date of the course.

[2] Such as A. H. Lybyer (PH.D. 1909), now Professor at Illinois, F. A. Golder (A.B. 1903), late Director of the Hoover War Library at Stanford, Professor J. Kerner (A.M. 1914), of Missouri, Professor Dexter Perkins (A.B. 1909), of Rochester, T. Lothrop Stoddard (A.B. 1905), the author, Julius Klein of the Department of Commerce, and Professors Fay, Lord, Blake, and Langer, of Harvard.

1904, Coolidge took up in addition the field of European colonial expansion in the nineteenth century; and in 1910 he was promoted to the high post of Director of the University Library. Robert H. Lord (A.B. 1906),[1] Coolidge's brilliant pupil, took up his work in Russian and then in Near Eastern History. After Lord's resignation in 1926 to enter the Catholic priesthood, instruction in the former field was undertaken by Michael Karpovich.[2] William L. Langer (A.B. 1915), a pupil of both Coolidge and Lord, undertook a part of the programme on recent European history in 1926, and two years later Professor Charles K. Webster[3] of the University College of Wales accepted a call to Harvard. In 1929 Sidney B. Fay (A.B. 1896)[4] of Smith College joined the faculty as Professor of Modern European History on an appointment jointly supported by Harvard and Radcliffe. To him fell the work in German History at Harvard, formerly given by Lord, as well as part of the responsibility for the direction of graduate students.

Between 1904 and 1920 the modern European offering was much enriched, and the Department enlivened, by the presence of Robert Matteson Johnston (B.A. Cambridge, 1889). An American of European birth and education, Johnston had a certain manner that impressed the undergraduates; and he was the most versatile and prolific member of the Department, offering courses on the Italian Risorgimento, the Rise of Prussia, the French Revolution, recent English History, Military History, European Diplomacy, Political Geography, and Historical Literature. He founded in 1916 a review called The Military Historian and Economist; and during the war he was attached to the General Staff, at General Pershing's headquarters, with a view to collecting historical data.[5]

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[1] Author of *The Second Partition of Poland* (1915); with Haskins, *Some Problems of the Peace Conference* (1920), translated into Polish; *Origins of the War of 1870* (1920).

[2] Candidate of Historical Sciences, University of Moscow, 1914; Secretary of the Russian Embassy at Washington, 1917–22.

[3] Author of *The Congress of Vienna* (1919) and *The Foreign Policy of Castlereagh* (1925).

[4] Author of *The Origins of the World War* (2 vols., 1928).

[5] Johnston was to have prepared the official history of the war, and to that purpose called various former pupils of his, such as Dexter Perkins, Joseph V. Fuller (A.B. 1914), and John K. Wright (A.B. 1913) out of the Army to serve on his staff. But the Army authorities did not appreciate the prospect of an objective history of the war. An officer of the Regular Army was placed over Johnston, his work very much interfered with, and finally cut off. Living in the war zone undermined Johnston's health, so that he succumbed to an attack of grippe in January, 1920. A perusal of the only pub-

During the war Coolidge went on several important missions for the Department of State. The Harvard History Department was at that time so well staffed in Modern European History that it took a very considerable share in preparing data for use at the Peace Conference, which several members attended with their former pupils, as attachés to the American Peace Commission. Coolidge, Haskins, and Lord had a perceptible influence in drafting the treaties of 1919; and Coolidge founded the periodical Foreign Affairs, in the hope of promoting that intelligent knowledge of international affairs which he had done so much to cultivate in the University.

The American is the oldest school of history in Harvard, if one regards Sparks as the founder; but Channing and Hart, with much aid from Justin Winsor and the *Americana* in the College library, were largely responsible for the high reputation that Harvard enjoys in that branch of history. When they began their teaching, in 1883, a knowledge of American history, as Emerton then remarked, might be supposed to be 'a part of those innate ideas some philosophers tell us about, for all the effort visible to compass it by way of education.' [1] At the time, Hildreth and Von Holst were the only available histories of the United States since the Revolution. At the retirements of Hart and Channing, in 1926 and 1929 respectively, it was impossible to take a step in American history without stubbing one's toe on their works, or those of their pupils and their pupils' pupils.

Two teachers and scholars more unlike than Channing and Hart never existed; and when they combined to conduct the Seminary of American History, as they did in 1890, Henry Adams's ideal of instruction — a class conducted by rival professors of opposite views — was realized.[2] Both wrote textbooks, both were generous of time and effort to their pupils; there the resemblance ends. Channing: short, round, and smooth-shaven, his lectures charged with irony and wit, de-

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lished result of his war experience, *First Reflections on the Campaign of 1918* (1920), suggests how much we lost. His more important works include *The Napoleonic Empire in Southern Italy* (1904), *Leading American Soldiers* (1907), *The Corsican* (1910), *Bull Run* (1913), *Clausewitz to Date* (1917).

[1] *The Practical Method* (1884), p. 50.

[2] *Education of Henry Adams* (1918), p. 304. "No irregularity shocked the intellectual atmosphere so much as contradiction or competition between teachers," continued Adams. The story of almost every department of the University refutes this statement; and, as we have seen, the Corporation promptly adopted Adams's request for a rival to himself.

livered from notes so meagre that a single visiting card sufficed to hold them; a terror at one time to undergraduates, but slowly mellowing into their philosopher and friend; ever a foe to tradition, myth, and historical humbug; concentrating every spare moment of time and ounce of energy on his great History of the United States, now nearing the completion of its eighth and final volume. Hart: of fine presence and with flowing whiskers, striding into his lecture-room laden with notes, and the air of a Roman general bringing home the spoils; every lecture an oration; producing the American Nation series, twenty-seven volumes by twenty-five scholars (himself not least), a symposium of the first generation of scientific research into American history; otherwise spending himself on public service; a political aide of his classmate Roosevelt, and the popular representative of Harvard and of American History on many committees, platforms, and festive occasions. Hart would cull the promising young men and encourage them, and send them to Channing's famous seminary (History 23, travelling forward with the great work from Columbus to Cleveland), to be discouraged; if they survived that, they might do.

Channing and Hart were alone in their glory until 1910, when prompt action deflected hither Frederick J. Turner of Wisconsin. The fourteen years that Turner remained with us passed too quickly; but they were fruitful years for his colleagues [1] and pupils. The discoverer of the Frontier in American History, and founder of a school of historical thought, he brought new wine to old bottles; and a legion of young Westerners came to drink thereof. Upon his deeply regretted retirement in 1924 he left one of his best pupils, Frederick Merk (PH.D. 1920), to carry on his work in the history of the West. S. E. Morison (A.B. 1908), has drifted in and out of the Department since 1915. After Hart's translation to the Department of Government, in 1910, these four divided or alternated giving the courses on American History from 1760 to the Present. Worthington C. Ford offered graduate students a valuable course on the Manuscript Materials of American History, during his twenty years' incumbency (1908–29) as Editor of the Massachusetts Historical Society. In the meantime Philip P. Chase (A.B. 1900, Dean of the Summer School and University Marshal) and James Phinney Baxter, 3d

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[1] The Channing, Hart, and Turner *Guide to the Study of American History* (1912) is a monument to this association.

(A.M. 1923), had risen by the tutorial route to the ranks, respectively, of lecturer and assistant professor. Arthur M. Schlesinger,[1] a former pupil of Osgood and Beard at Columbia, came to us from Iowa in 1924 bringing with him the 'New History': the conception of history as the sum-total of human activity. Another important series, a History of American Life in twelve volumes, is now being issued under the joint editorship of Schlesinger and Dixon R. Fox of Columbia.

Johns Hopkins University, long the friendly rival and pacemaker of the Harvard Graduate School, gave us one of her greatest sons in 1902 in the person of Charles H. Haskins.[2] Haskins laid out for himself a colossal programme of teaching and research, which he realized; and of all the Harvard historical scholars of the present generation, his name is best known abroad. Coolidge, in the year after Haskins came, began to reorganize History 1, which had attained a registration of 488, on the system of two lectures a week and a weekly section under an assistant, in which the reading of the week was tested by a short paper and a discussion.[3] Haskins took over History 1 in 1904, completed the reorganization, and made it a course in Mediaeval History. The shorter scope permitted greater depth, so that the average student could get an effective grip on mediaeval history; but the average student did not want that; and the requirement of two full introductory courses (History 1 and 2) caused such a decline of students in the middle group that in 1912 History 1 became Mediaeval and Modern once more.

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[1] Author of *The Colonial Merchants and the American Revolution* (1918), *New Viewpoints in American History* (1922), and sundry surveys, syllabi, and textbooks.

[2] Author of *Norman Institutions* (Harvard Historical Series, 1918), *The Renaissance of the Twelfth Century* (1927), *Studies in the History of Mediaeval Science* (1924), *Studies in Mediaeval Culture* (1929), *The Normans in European History* (1915), *The Rise of Universities* (1923). Cf. Lesquier, *Les études de M. Haskins sur les institutions normandes* (1918).

[3] Many of the assistants in History under Coolidge and Haskins have since become leaders in their profession; men such as A. H. Lybyer, S. B. Fay, C. H. Haring, C. Reed, R. H. Lord, H. L. Gray, J. K. Wright, above mentioned, Laurence B. Packard (A.B. 1909), Professor at Amherst; Hiram Bingham (A.M. 1901), Professor at Yale and United States Senator; Waldo G. Leland (A.M. 1901), Secretary of the American Council of Learned Societies; Henry R. Shipman (A.M. 1901), Professor at Princeton; Harrison C. Dale (A.B. 1907), Professor at Idaho; Harry M. Varrell (A.M. 1909), Professor at Simmons; Richard A. Newhall (A.M. 1914), Professor at Williams; Robert H. George (A.M. 1913), Professor at Brown; Clyde L. Groce (A.M. 1914), Professor at Northwestern; R. F. Arragon (PH.D. 1923), Professor at Reed; C. B. Goodykoontz (PH.D. 1921), Professor at Colorado; R. G. Trotter (A.M. 1915), Professor at Toronto. Besides these Professor William E. Lunt (A.M. 1905) of Haverford, Professor Carl Stephenson (PH.D. 1914) of Wisconsin, Professor Charles W. David (PH.D. 1918) of Bryn Mawr, Professor Sidney B. Packard (A.M. 1916) of Smith, have been Haskins's pupils.

In the middle group of courses, Haskins has always given a course on Mediaeval History — generally on France, or the Intellectual History of the Middle Ages. In the graduate group he promptly revived the abandoned courses on Diplomatics and Palaeography,[1] created a seminary on the sources of Mediaeval History, together with one on Historical Bibliography and Criticism, in which selected historical problems from early Roman to recent American history were attacked by members of the group. These courses gave graduate students the sort of professional equipment and training that formerly they had to seek at the Ecole des Chartes or a German university. In 1908 Haskins became Dean of the Graduate School,[2] but carried his full load of teaching, and continued, in his vacations, important researches on Norman institutions, which gave the finishing blow to the Anglo-Saxon theory of English history.

There is a certain massiveness about Haskins's character and intellect, combined with a sharpness of perception and a twinkling humor, that make his personality the most pervasive in the department. His knowledge of history is equalled only by his acquaintance with historians and universities; and no one has so spent himself in the service of his adopted university.

In the allied field of the History of Religions, Charles Carroll Everett, Bussey Professor of Theology, lectured regularly until his retirement in 1900. He had a peculiar interest in the religions which had developed within themselves a religious philosophy or theology, and in those which, from his Hegelian point of view, might be taken as types; for example, Confucianism, 'the religion of the understanding' (in the Kantian sense); the religions of India, especially the philosophies of the Vedanta and Sankya, as 'the religion of truth'; Zoroastrianism as 'the religion of goodness'; and the religion of the Greeks as 'the religion of beauty.'

The Hancock Professor of Hebrew, Crawford H. Toy (A.M. Virginia 1856, sometime private of artillery, C. S. A.), a sweet and lovable scholar of the old school, for many years gave instruction on religious theory, and excellent courses on the History of the Bagdad and the Spanish Califates.[1] Anyone interested in the history of religions as distinct from religious history, could pick up courses by Kittredge, Gulick, Fred N. Robinson, and Clifford H. Moore on most of the pre-Christian religions of Europe; but there was no one at Harvard capable of a synthetic survey of all religions of all countries until George Foot Moore (A.B. Yale 1872),[2] Preacher to the University in 1900, became teacher as well in 1902. Humor and massiveness are combined in Moore much as in Haskins; both are leading authorities in their respective fields.

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[1] Given in 1892–93 by Bendelari, and in 1897–98 by James Sullivan (A.B. 1894), later a leader among history teachers in secondary schools, and State Historian of New York. Edward K. Rand of the Classical Department has also given a valuable course on that subject.

[2] See his chapter on the Graduate School of Arts and Sciences, below.

Ancient History was the Department's derelict from the middle seventies until 1908, when William Scott Ferguson (PH.D. Cornell 1899), son of a Senator of the Dominion, took charge.[3] Competent scholar and inspiring lecturer that he is, Ferguson has built up a strong following; and as chairman he navigated the Department of History through perilous years. He succeeded Channing in the senior chair of History, the McLean, in 1929. English and Modern European History received a new recruit in 1902 in the person of Roger Bigelow Merriman (A.B. 1896) who, sent to Oxford to be weaned from architecture, was converted to history by the famous A. L. Smith, and became Coolidge's assistant and Instructor, on his return in 1902.[4] Merriman's specialty is Spanish history, which for many years he offered alternately with the time-honored course on Tudor and Stuart England (History 11). In 1907 he gave the first course at Harvard on the History of Latin America, and in 1913 procured a gift from Robert Woods Bliss (A.B. 1900) for a chair in that subject. The first incumbent was the witty and gifted Julius Klein (A.M. 1913), who soon left to follow the star of Mr. Hoover. For one year a distinguished Brazilian, Señor Manoel de Oliveira Lima, filled the chair. Finally Clarence H. Haring[5]

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[1] Author of an *Introduction to the History of Religions* (1913).

[2] Author of a *History of Religions* (2 vols., 1913–19), *The Birth and Growth of Religion* (1923).

[3] Author of *The Athenian Archons* (1899), *Hellenistic Athens* (1911), *Greek Imperialism* (1913). Eduard Meyer came as exchange professor in 1909–10.

[4] Author of *Life and Letters of Thomas Cromwell* (1902) and *The Rise of the Spanish Empire* (3 vols., 1918–27). He became Gurney Professor of History in 1929.

[5] Author of *Trade and Navigation between Spain and the Indies* (1918), and numerous lectures and addresses before the universities of Hispanic America.

CHARLES HOMER HASKINS

ALBERT BUSHNELL HART

WILLIAM SCOTT FERGUSON

(A.B. 1907) returned from Yale to take full charge of the History of Hispanic America.

Students of history at Harvard have been particularly fortunate in what they could obtain in other departments. Apart from the obviously allied field of literature, there have been, since Norton and Palmer began to lecture, excellent courses on the history of fine arts and of philosophy; and, in recent years, courses by George Sarton and Lawrence J. Henderson on the history of science. Edwin F. Gay, reversing the common academic jest, is claimed by the historians as an historian, even though a member of the Economics Department. Since 1902, with the exception of an interlude of war work and journalism, he has been giving courses on the economic history of America and Europe, an indispensible part of the historical programme. Henri Hauser, exchange professor in 1922–23, lectured on economic history during his short stay.

After the retirement of Macvane (1911), English History of the eighteenth and nineteenth centuries was given by visiting lecturers (such as Harold Temperley of Peterhouse and G. W. Prothero of King's) until 1916, when the youthful Harold J. Laski, an Oxford 'first' of two years standing, came to Harvard for an eventful sojourn of four years.[1] When he and Merriman were lecturing on English history, the situation desired by Henry Adams was again fulfilled. Laski had a provocative influence on many undergraduates. At his house could be heard some of the best conversation in Cambridge; his experiments in academic freedom furnished much of the conversation elsewhere. When Laski accepted a call to the University of London, in 1920, English History, so tossed about since the passing of Macvane, received a safe and competent pilot from Yale: Wilbur Cortez Abbott.[2]

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By 1904 the elective system in its freest and final form was twenty years old at Harvard; and had ceased to be regarded as an experiment by educators and the public at large. History and Modern Literature had profited by it as much as any subjects in the curriculum. Yet there were men in both departments who were dissatisfied and depressed at the careless scattering of undergraduate effort, and the small value put on academic honors. In order to start a reorientation of the mind of the undergraduate, to make him think of *studying a subject* rather than *taking a course*, a small group of professors — Barrett Wendell, Lowell, Haskins, Merriman, W. H. Schofield, and C. N. Greenough — devised a new plan of study that would cut across departmental and course lines, and permit a student to survey the thought and achievement of the past with some definite plan, and under definite discipline. This was the 'History and Literature' grouping, an assault on the old lines which got into the catalogue in 1906 as a 'field' in the new regulations for the degree with distinction, and was first examined in June, 1907.[1] The pioneer features of the History and Literature arrangement were (1) that the candidate studied the history *and* literature of a country or of an era; (2) he pursued a course of reading under the supervision of some member of the committee, and was given the then shocking suggestion of doing it in the summer vacation; (3) he was examined *viva voce* on his subject — not his courses — at least six of which he had to choose from those offered in History and in Literature. A thesis, ordinarily an expanded course thesis, was also required.

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[1] Author, while he was here, of *Studies on the Problem of Sovereignty* (1917), *Authority in the Modern State* (1919), and *Political Thought in England from Locke to Bentham* (1920).

[2] B.LITT. (Oxon.) 1897; author of *Conflicts with Oblivion* (1924), and *The New Barbarians* (1925).

Professor Lowell was one of the original advocates of this reform, which as President he promptly extended to the entire college, pass men and honor men alike. His first step along this path was the principle of 'concentration' and 'distribution,' first adopted for the Class of 1914. Mr. Lowell's former Department initiated, and the Division of History, Government and Economics adopted, in 1914, the second and more important step: the Divisional Examination and Tutorial System.[2] The first tutors were appointed in the autumn of 1914, and the first divisional examinations were held in May, 1916, for 24 members of the Class of 1917 who were finishing that year.

History and Literature became a 'field of concentration,' and obtained its own staff of tutors, a year after History, Government and Economics; but the History and Literature committee had exercised tutorial functions informally since 1906, and that field has always depended more on tutoring and less on courses than any other. The committee has had enthusiastic chairmen: Wendell until 1917, Chandler Post for five years, and Merriman since 1924. The tutors — such as the lamented Frederic Schenck (A.B. 1909) — have found the work so interesting as to stay with it; and the secretaries — notably Edward A. Whitney (A.B. 1917) — have had almost a paternal relation to the students in this field. The percentage of concentrators in History and Literature seeking honors has never fallen below 60 per cent, about twice the average for Harvard College.[1]

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[1] The first man to take the History and Literature examinations was Edward B. Sheldon (A.B. 1908), the dramatist. At the same date were given the first examinations for the degree with distinction in history, economics, and political science. But History and Literature alone had the features which give it the claim to have been the precursor of 'concentration' and tutoring.

[2] See the introductory chapter on College Studies for degrees with distinction, divisional examinations, and the tutorial system.

It was only natural that historians and teachers of literature should be pioneers in these reforms, for such subjects are not cumulative by nature. No one can study higher mathematics without a mastery of the intermediate steps; but a student of history, with no general examination to look forward to, could (after taking History 1) skip all about the field, forgetting courses as soon as the examination was passed and the grade entered to his credit in the Recorder's books.

In view of the tutorial system, the course programme in History has not been expanded since the war, except to meet the wants of graduate students. Peripheral courses such as the History of India and of Massachusetts have been dropped for want of demand. Others have been added, especially by tutors who like to give courses on their specialties; a tendency that the Department encourages, since it tends to keep alive the tutors' interest in scholarship. Notable instances are the courses on Byzantine History offered by Robert Pierpont Blake (A.M. 1909),[2] an authority on the languages and history of Russia and the Near East, who entered the Department by the tutorial route, and in 1928 succeeded Coolidge as Director of the University Library. Others are provided by special foundations, such as those on the Mediaeval Church offered by Dr. George La Piana (PH.D. Palermo 1912), Professor of Church History in the Theological School;[1] and those on the Far East by Dr. Stanley K. Hornbeck.[2] It is also due to the divisional examinations and the tutors that the Department no longer attempts to 'cover' the vast field of human history with courses.

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[1] *The New England Quarterly, an Historical Review of New England Life and Letters*, was founded in 1928 by two members of the History and Literature Committee.

[2] Co-explorer and author with Kirsopp Lake of *The Serâbît Inscriptions* (1928) and of the *Catalogue des manuscrits georgiens de la bibliothèque patriarchale grecque* (1924). Byzantine history was first lectured on at Harvard by Charles Diehl, the great French authority, in 1911–12; he returned for another memorable visit in 1926.

History 1, the introductory course, was restored to its original scope of European History from the Fall of the Roman Empire to the Present, by Professor Haskins in 1912–13. At the same time he adopted the expedient of having some of his colleagues give the lectures from the Reformation down, useful both to parade the Department before the Freshmen, and to relieve the professor. There has been at one time and another talk of a general survey course for Freshmen in all the social sciences; but Harvard historians have never given any countenance to this expedient of 'progressive educators,' as likely to spread out the subject-matter too thin.

Merriman took full charge of History 1 in 1923, rejuvenated it, and made it the best sort of recruiting ground for later courses. Merriman's inspiring style of lecturing gets attention from the most sleepy nine-o'clock Freshman. The corps of assistants — 'section hands' as the undergraduates call them — was overhauled, men being chosen for personality and teaching ability, rather than for scholarly attainments. Even athletes and social lights have been pressed into service, and not a few, in consequence, have adopted history as their vocation. A series of collateral readings in sources and biographies, on the life and literature and science of selected periods, arranged and administered by Edward Motley Pickman (A.B. 1908), gives each member of the course an opportunity to do intensive study on a small phase of the field.

Since Emerton's retirement in 1918, Merriman and Edgell of the Fine Arts Department have given History 7 on the Renaissance and Reformation, Edward A. Whitney coöperating with lectures on literature, and A. T. Davison of the Music Department with organ recitals of Renaissance music. This tendency to study periods of human activity as a whole, rather than a single aspect of it, has rapidly extended, notably to Schlesinger's courses in American history. Equally marked is the tendency to drop the lecturing method in small courses, which then become in effect tutorial groups.

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[1] Author of *Le rappresentazione sacre nella letteratura bizantina dalle origini al sec. ix con rapporte al teatro sacro d'Occidente* (1912), and *Recent Tendencies in Roman Catholic Theology* (1922).

[2] Author of *Contemporary Politics in the Far East* (1916). Dr. Hornbeck resigned in 1928 to become head of the Far Eastern Division in the Department of State. His place was taken temporarily by Professor William Hung (S.T.B. Union Theological Seminary 1920) of the Yenching University.

Such have been the activities of the devotees of Clio at Harvard during a period of sixty years. An occasional reader may ask, of the modern historians at least, 'What of their conclusions?' For the public is beginning to display an intrusive interest in the 'views' of history teachers, as of old in the doctrines of theologians; to apply the test of so-called patriotism rather than the literary standards of an earlier era, or the scientific and scholarly standards that the historians themselves have established. Hardly any two members of the Harvard History Department belong in the same camp; but all consider it unethical to make History the handmaid of propaganda. History, if rightly taught and studied, should remove prejudice rather than create or strengthen it. The spirit of Henry Adams's classes, in which young Democrats became acquainted with Federalist doctrine, in the hope that understanding might replace abhorrence, is still strong among Adams's successors. They believe that the function of history in education is not merely to inform, but to liberate; to impart the knowledge and inculcate the fairmindedness that mark an educated and civilized man.

VIII. GOVERNMENT

1874–1929

By Albert Bushnell Hart, LL.D.
Eaton Professor of the Science of Government, Emeritus

INSTRUCTION in government in Harvard College has passed through four chronological stages. In the first, lasting until 1874, it was represented in the curriculum only by smatterings. During the second period, 1874–92, instruction in Roman law, mediaeval institutions, and international law and diplomacy came in under the Department of History, together with some effort at systematic courses in constitutional government. In the third period, 1892–1911, systematic descriptive courses came to the front, alongside older courses devoted to personalities and events, rather than to the growth of political institutions. In the fourth period, 1911–29, the instruction in government has been expanded and enlarged, so as to include some technical and many specific courses, with abundant opportunities of research and individual work in the fields of politics and applied government.

1. Prehistoric Period

When in 1911 a separate Department of Government was created under the Faculty of Arts and Sciences, that august body was simply taking cognizance of a field of academic study, of which the most distant verge is traceable nearly two centuries ago. No 'Gov.' appeared in the formal list of studies in early days at Harvard. Nevertheless, there always existed here the conception that a knowledge of the principles upon which governments are founded is desirable for the collegian.

Hence, in 1743 we find Samuel Adams, in his Master's Commencement part discussing the awful question: 'An supremo Magistratui resistere liceat, si aliter servari Respublica nequit?' John Adams, as a student and young graduate, dug into Justinian's Institutes. He and his student friends read Bolingbroke's Study and Use of History, and criticized his ideas of the British Constitution. The works of European publicists such as

Heinnecius, Burlamaqui and Vattel helped to educate some of those budding statesmen; which was fortunate for their country when they became representatives of the United States in Europe.

In the early nineteenth century arose citizens who aided the little College to search deeper. Besides Christopher Gore (A.B. 1776) and Samuel Livermore (A.B. 1804), who gave books and endowments in 1823, John McLean laid a foundation for a future Department of History by bequeathing a fund for 'the establishment and support of a Professor of Ancient and Modern History at that College.' Nevertheless, the first three-quarters of the century were a barren period for the teaching of government. Recitations on The Federalist and on Story appear now and again in the list of studies; and as late as the year 1877, the only specific instruction in government within Harvard College was one half-year of Sophomore History: a miserable little high-school course, with a stupid textbook and a superlatively incompetent instructor.

2. Government through History, 1874–1892

Systematic instruction in government, beginning at Harvard in 1874, came in along the converging road of the history of institutions, directed by the most vigorous intellect that has yet arisen among professional American historians. In 1870 appeared a three-hour opportunity entitled 'Mediaeval Institutions. Asst. Prof. Henry Adams.'[1]

For some years the institutional stress was taken over by Professors Gurney and Torrey. The former was a remarkable teacher and personal friend of students; the latter, an accomplished and genial scholar, who in his whole life-time published but one book, — a Latin lexicon to which his name was not affixed, — yet was an inciter to learning. To Professor Torrey appears to be due the epoch-making invention of a new method of undergraduate study of history and kindred subjects. That was the system of assigned parallel readings, of which account would be taken in the examination; a blow at once to autocratic teaching and to too much intimacy with a single textbook. From 1875 to 1881 Torrey offered graduate students what he called a course in International Law. He was not a lawyer and not an internationalist. His course, however, aroused students to the existence of legal precepts and limitations on the action of nations.

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[1] See Professor Emerton's chapter on History, above.

The first general course in government appears to have been introduced by Macvane in 1879 under the title Constitutional Government in England and the United States, precursor of Government 1. Professor Macvane's master intellect was able for years to contrive each annual elective pamphlet. Slow of speech, meditative in delivery, he carried a vast burden of teaching and responsibility.

Government, politics, institutions — whatever you choose to call it — this daughter of history soon became no longer child but sister. This was the period at Harvard of an embryo graduate school, combined with instruction of a graduate type available for undergraduates. In the specific field of what was then usually called 'political science,' Harvard developed later than some other universities. The first of these in the United States was the School of Political Science, founded by Columbia College in 1880. It opened with a special faculty of able and highly paid professors, and has ever since been in operation. The University of Pennsylvania in 1881 founded the Wharton School of Finance and Economy, which leaned toward the economic side. A little later came the historical-political course at Johns Hopkins University, entirely graduate. Then a similar organization of graduate study in western universities.

Several influences led finally to an emphasis on government courses at Harvard. The first was the creation of a separate Department of Political Economy in 1879. This movement was headed by Professor Dunbar, whose sweetness and force of character, whose interest in truth, and whose great services to the University are elsewhere set forth in this volume. Under the stimulus of Taussig and other teachers, whose college training had been largely historical, that department began to concern itself with studies, courses, and doctor's theses in such subjects as taxation, government subsidies, currency, banking, and control of railroads. The study of these phases of government was becoming respectable in several institutions of learning.

In this period, Roman Law was pursued under the tutelage of Ernest Young, and of a Law School graduate, William Schofield (A.B. 1879). Charles Gross dealt with the municipal government of the middle ages.

An impetus was given to this trend through the entry into the service of the University of a body of young scholars, most of whom had been students in European countries. In Germany, beginning with courses in the Roman Law, scholars had become immensely interested in what they called 'constitutional law,' which meant the governmental foundation of institutions somewhat Romanized, but originally Germanic. Alongside this somewhat pedantic school was a body of scholars and lecturers of the Ranke type. Graduates of American colleges were beginning to frequent that instruction.

That the history of the United States contained elements for the study of public and international law was the next striking discovery. A younger group came forward, inspired by Adams and Ernest Young and Emerton. Of these, Channing took his Ph.D. at Harvard in 1880; Hart studied in Berlin and Paris, and took his degree at Freiburg in 1883, with that eminent writer of American constitutional history, Von Holst. Gross had a thorough German training. Archibald Coolidge also took his degree at Freiburg. Both he and Hart always remembered with gratitude and satisfaction a year at the Ecole des Sciences Politiques in Paris.

These men and others introduced into the study of Government the seminary method: the treatment of governmental principles and manifestations as subjects for scientific study. The method involved a group of students gathered about a teacher, or a pair of allied teachers, each student pursuing a special subject from the sources. Such organizations shocked even such far-sighted men as Gurney, but were warmly supported by President Eliot. By 1887 the seminary was permanently established at Harvard, and has continued to be one of the most stimulating and productive methods of instruction.

3. Government Allied with History, 1892–1911

Upon the earlier foundation was built up, from 1892 to 1911, a substantial body of instruction, based not alone upon Roman institutions and their derivatives in Europe, but upon the actual performance of government in modern countries, and particularly in the United States of America. Courses in Roman Law were given to undergraduates by F. B. Williams (A.B. 1888) until 1897, and again, after 1903, by Charles H. Haskins.

Charles Gross continued his courses, which involved not simply a knowledge of truth, but a knowledge of truthful methods of finding the truth and of stating it. Emerton kept up a course in the Canon Law. Hart originated a course in Federal Government, which in various forms he maintained until his retirement in 1926. He also initiated an historical course in American Diplomacy, as one of the functions of the United States Government. American Constitutional Law was handled in the Law School by two teachers, James Bradley Thayer and John Chipman Gray. Their courses were theoretically open to undergraduates, and not above the heads of the best; but it annoyed them to have 'college boys' in their audiences, and the Department finally offered courses of its own in American Constitutional History and Constitutional Law. A formal introductory course in European and American Governments, pitched for the undergraduate, was developed by Macvane, and has lasted through various instructors to the present time. A variety of seminary courses was offered by Channing, Munro, and for a time, by Frederic J. Stimson (A.B. 1876).

A great advance in the teaching of government at Harvard was due to the coming in of a vital human force: A. Lawrence Lowell. One spring evening, the writer was called by telephone from the focus of the University. 'I understand,' said the voice of President Eliot, 'that it might be possible to obtain the services of Lawrence Lowell to teach government. What ought we to offer him?' To which only one reply was possible: 'Mr. President, offer whatever is necessary to secure him.'

The newcomer first gave an advanced course called Studies in Existing Political Systems and the Influence of Political Parties. The following year (1898-99) he shared the introductory course with Macvane, and, after a year's absence and reappointment as Professor of the Science of Government, he repeated this arrangement. In 1901 Professor Lowell took entire charge of Government 1, and with a body of intelligent and interested assistants reorganized it like the president and staff of a bank.

The annual registration in each of the three elementary courses in this Division — History 1, Government 1, and Economics A — had now passed the four hundred mark,[1] and exhibited every sign of growing larger with the College. There was no longer any lecture hall in the College that could contain

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[1] See chart opposite p. 195.

A. LAWRENCE LOWELL

1896

WILLIAM BENNETT MUNRO

GEORGE GRAFTON WILSON

these courses, except Sanders Theatre. It can now be told that the anonymous donor who built the New Lecture Hall in 1902, with its spacious, well-lighted auditorium and convenient rooms for section meetings, was none other than the present President of Harvard College.

Lowell's personality, and his intelligent handling of the introductory course, attracted many more students than before to the subject. If Harvard was behind in graduate instruction in Government, she now more than made up for it by the variety, interest, and significance of her undergraduate offering. Government 1 was also an essential part in the training of Professor Lowell, preparing him for the greatest opportunity but one that has come to a Harvard man: that of guiding his University, an institution which is a first-class example of actual government.

That phrase 'actual government' appears to have been coined within the Department. It embodies two fundamental and, at that time, novel ideas. First, that, for the knowledge of the government of any country, it is necessary to go down to the bottom and to find what is the actual source of the authority exercised by a government. Up to that time, even in Germany, the study of government was a study of sovereigns, of legislative houses, of courts, of armies and navies. Actual government includes the real propelling force of the population that makes an enforceable decision; the inside workings of deliberative bodies and of administrative chambers.

The phrase also connotes study of the decisive forces in a system of government. To arrive at the truth with regard to any system of government may be as arduous and as satisfying as to establish the relations between the stars of the firmament or the influence of Latin authors upon English literature. Actual government treats the political organizations of mankind as one of the most significant functions of human beings; and at the same time develops a method by which these evasive incidents and elements may be observed, recorded, and compared.

Among the notable events in the Department of History and Government was the reappearance in the year 1904 of Dr. William B. Munro (A.M. 1899), then Professor of Government at Williams. His work with Lowell in Government 1, and in the field of Municipal Government will be described presently.

In this period some attempts were made also to develop for undergraduates the study of administrative law, especially of the United States. For several years a general course in law was offered for undergraduates, the idea being to fill the mind of the average undergraduate with fundamental principles of law; and also to ease the way into the Law School. Neither of these results was obtained; nor has the Department been fortunate in its efforts to establish courses given by graduates of the College and others who are occupying public positions in commonwealth, municipality, or nation. A man whose direct connection with the University is three sessions a week taken out of his professional time, does not 'sock it home' to the undergraduate. The policy of the Department has been more and more to depend upon all-the-year-rounders.

A field in which the Department made great progress in this period is that of International Law. The courses in Conflict of Laws and Comparative Public Law, as given by professors in the Law School, have not attracted large numbers of students. Here again, the Law School professor has his job, clear, distinct, and engrossing; in general, those courses are not attuned to the undergraduate.

4. Period of Development, 1911–1929

An administrative change came in 1911, when a Department of Government was entirely set off from the Department of History. Under that title it has operated for eighteen years, a period of constant expansion in the department. It has increased in number of teachers, in number of elective courses, and in resources of every kind; and has established itself as one of the active and thriving departments of the University.

Of great significance has been the development of courses on political theory. Such instruction was not absent in the previous periods. Three different types of courses in that field have been offered: a history of political theories, present political theories, and topics in political theory. Munro, Yeomans, Holcombe, McIlwain, and Elliott have offered courses in the field, which is an established and important part of the programme of the department. Laski, a brilliant luminary from England, gave an interesting course on the recent history of political ideas. Roman Law has been maintained principally by McIlwain. Constitutional Law has been, since 1911, principally in the hands of Yeomans, besides courses by Stimson, Holcombe, and

Léon Dupriez, who came to us during the World War from the University of Louvain.

The widest development in this field during the last twenty years has been in international law, and in state and municipal government. International law, as has been seen, went through many hands, sometimes not highly skilled. In 1907 Professor George G. Wilson began his service in that field, and has continued it unflaggingly. His fundamental course in Elements of International Law has been followed by hundred of students. In addition he has offered special courses on Selected Cases in International Law, and on International Law as Administered by the Courts. Hart for many years maintained a course on American Diplomacy, which was an historical account of diplomatic controversies and adjustments, intended as a background for courses of international law.

The advent of Arthur N. Holcombe (A.B. 1906) in 1909 added a powerful force to the Department. A graduate of Harvard, and later a student abroad, he brought to his work a remarkable vitality. He has been widely acquainted with people engaged in the practice of government, and has many fields of interest. Munro, in addition to the building up of courses then unique, in Municipal Government, has been the adviser of several mayors of Boston. His Bureau of Municipal Research has initiated students into the practical problems of municipal government. As a writer on that subject, Munro is the principal American authority.

All the elder teachers have steadfastly maintained some form of seminary, involving the preparation of theses from sources, under the supervision of the instructor.

Among the younger men who have come forward during the past ten years, the most significant is William Y. Elliott, who, like several others of the younger professors, took his part in the World War, and has had large experience as a student abroad. He has brought to the Department an inextinguishable illumination on the ideas underlying government. Munro, Holcombe, and Elliott have been the upbuilders of the Department during this period. They have drawn about them a body of promising young men who are expected to be the leaders in the next generation.

Of the public and literary activities of our members there is no room here to speak. Several have served as national, state, or municipal officials; as members of constitutional conventions; as directors of investigation into public services; as advisors to public officials. Their books are legion. They have aided to create a literature which is necessary for the advance of their chosen subjects.

Harvard not being a state university, the members of its Department of Government are not often called upon to give advice to public officials or to participate in public affairs; but their expert knowledge is always at the service of state or city, when required. Holcombe served on the Massachusetts Minimum Wage Commission from 1912 to 1918 and on Governor Coolidge's commission for investigating the compensation of teachers; Hart served as member of the Constitutional Convention of 1917–19; and Munro was chairman of the commission to compile information and data for that convention.

The Department of Government is a vital forward-looking body of scholars and teachers, productive and effective. The living members who have taught that subject during the past fifty-four years look back with satisfaction on their organization as a polity. They feel that they are citizens of no mean city.

IX. ECONOMICS

1871–1929

By Frank William Taussig, Litt.D.
Henry Lee Professor of Economics

1. Dunbar and the Quarterly Journal

THE appointment of Charles F. Dunbar in 1871 as Professor of Political Economy marked a new stage in the teaching of that subject not only in the University but in the country at large. His was probably the first professorship established in the United States which was devoted *eo nomine* to the subject. Before this date it had indeed been taught, but always in connection with moral philosophy, of which it was regarded as a branch; as indeed it is, in the larger sense. There had been required courses on Political Economy in the sixties: petty courses, using books so elementary as to be almost childish, and running for a few months only. Anything more pretentious had been classed under Philosophy.[1]

It was the very association of Political Economy (as it was then still called) with the wider subject that probably had something to do with Dunbar's appointment and with the complete change of front which it signified. In previous years the subject had been taught in the College by Professor Francis Bowen (A.B. 1833), a scholar of high ability and an effective teacher of the old-fashioned kind. His book on American Political Economy, now forgotten, was in its day no mean intellectual performance. An independent and somewhat obstinate person, he set forth unflinchingly views of his own which were not welcome to the personages then most influential in Harvard affairs. This was the greenback period, when the contest was keen between the hard-money men and the soft-money men. Bowen, while a conservative in most matters, allied himself with the soft-money men to the extent of advocating the payment of the national debt, not at par in gold, but at a considerable discount from par; a proposal that seemed scandalous to the orthodox. Dunbar had for many years been editor of the Boston Daily Advertiser, and as such had handled the monetary question with the sagacity and judgment, and also the tinge of conservatism, which marked his subsequent academic career. Bowen could not be got rid of; but the appointment of Dunbar served the purpose of putting the teaching of political economy into hands that were deemed safe.[1] It was all arranged in 1869, but not actually put through until 1871, twenty years after Dunbar's graduation from Harvard College. He took the intervening two years for a much-needed rest from his newspaper work, as well as preparation for his future career. The chair of Political Economy was established by the Corporation January 6, 1871; Dunbar was appointed Professor on February 10, and entered upon his duties the following September.

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[1] The present writer recalls that in the early days of his connection with the University he found curious evidences of this association of moral philosophy in the shelves of the College Library, then housed in old Gore Hall. Moral philosophy there had an alcove of its own, and in that alcove were to be found books upon metaphysics and ethics, books on political economy, and books, also, on other subjects no less closely related to moral philosophy, such as Education. You might find side by side on the library shelves, Adam Smith's *Wealth of Nations*, Paley's *Evidences of Christianity*, and a calendar of the University of Oxford.

A successful editor and editorial writer, Dunbar had in him a bent for much more. He was a scholar in the best sense, with a strong interest in the history of economic thought and in the history of economic events; sometimes, indeed, with a touch of antiquarianism. As was natural in view of the problems before the public in those days, his attention was given chiefly to monetary problems and to public finance. His writings on banking and on the financial history of the United States are of the first order, distinguished by accuracy, rare good judgment, and not least by a dignified rounded sytle, representative of the best literary work of his generation. He became a close associate and warm personal friend of President Eliot, who turned to him frequently for advice, and for aid in carrying out his plans. Dunbar was twice Dean, first of the College Faculty, later of the new Faculty of Arts and Sciences; and he gave much of his comparatively slender strength to administrative work. Hence he failed to achieve what his many friends and admirers expected in the way of permanent contribution to the literature of his subject.

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[1] One curious consequence of the dissatisfaction caused by Bowen's attitude on the greenback controversy was the establishment of a fund for lectures on political economy, which remains in the hands of the University to this day. The fund was got together by subscriptions from Boston gentlemen; at first it was in the hands of independent trustees, but was eventually turned over to the Corporation. It was expected that the money would be used for lectures from persons not connected with the University, and the donors had it in mind that these lectures should serve to bring before the academic community, as well as the community at large, views on monetary policy which were thought to be sound. Very shortly after, Professor Dunbar's appointment altered the situation, making the fund virtually unnecessary for the purpose which its donors had chiefly in mind. The terms under which it was finally turned over to the University are liberal; any subject within the purview of economics can be lectured on, and principal as well as interest are at the disposal of the Corporation in any way that body sees fit to use them. It has been used from time to time for the purpose of bringing to the University lecturers who have been free to deal with any and every phase of economics; and it is still intact.

One phase of Dunbar's career may be noted here, although it bears upon the University's contribution to economics for a period long beyond his day. This was his work on the Quarterly Journal of Economics. That periodical was launched in 1886, its establishment being made possible through a gift from John Eliot Thayer (A.B. 1885) for research and publication in economics. It was the first periodical of the kind established in the United States and, indeed, in any English-speaking country; and moreover one of the very first in its subject in any country which from the outset addressed scholars and not the general public.[1] The Journal was continuously published from that date, and will have reached its fiftieth anniversary in 1936. Largely owing to Dunbar's intellectual discrimination, it became one of the leading economic periodicals in the English language; and the efforts of his successors have kept it in that rank, despite ever-increasing competition.

Even the title of the Quarterly Journal of Economics has significance; it foreshadowed the change from 'Political Economy' as a title descriptive of the subject and of the courses in Harvard Unversity,[2] to the now-accepted and certainly better term 'Economics,' in 1892. These matters of phrase signify more than might be supposed at first sight. They indicate a change in the character of the subject. The old political economy, represented in the 'seventies and 'eighties by John Stuart Mill's great treatise, had reached its best and in a way its final stage; the time was ripe for new developments. The University, or rather the Department as developed in Dunbar's day, was awake to the need of fresh views. President Eliot, always alive to progress, was interested in economics and had the advantage of Dunbar's advice in planning for enlargement. James Lawrence Laughlin (A.B. 1873, PH.D. 1876), already Instructor, was made Assistant Professor in Political Economy in 1883. A pledge from Henry Lee (A.B. 1836), an ever-intelligent benefactor, made it possible to add a second assistant professorship, to which Frank William Taussig[1] (A.B. 1879, PH.D. 1883) was appointed in 1886. The Department, now standing by itself, was able to present a substantial offering.

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[1] The 'Q. J. E.' was a model for the British Economic Association in founding the *Economic Journal* in 1891.

[2] The Economics courses were listed under Philosophy in the College catalogue before 1872 and between 1874 and 1879. In 1872–74 they were under the heading Political Science, and from 1879 to 1892 under Political Economy.

Naturally the questions which were uppermost with the public at that time influenced the direction taken by the work of the new members. Just as Dunbar gave most attention to money and public finance, so Laughlin gave most attention to the then-emerging silver controversy, while Taussig plunged into the ever-persisting tariff wrangle. The more permanent intellectual interests of the subject, however, were by no means neglected. The Department from the first gave attention to economic theory; and the slant which was thus given its work under Dunbar's leadership persisted. It was always known in the country as giving much attention to the matters of principle which are indicated by the term 'economic theory,' and also to the history of the development of economic thought.

Another aspect, the historical, was emphasized by the appointment in 1892 of William J. Ashley[2] as Professor of Economic History. As in the case of Dunbar, this was an unprecedented move. Ashley's appointment was evidence of a desire to promote the new current of thought for increased attention to history in its widest range: letters, law, morals, as well as economics. He remained in service for nearly ten years, resigning to accept a chair in England. His place was soon taken by a scholar of no less distinction, Edwin F. Gay,[3] whose activities

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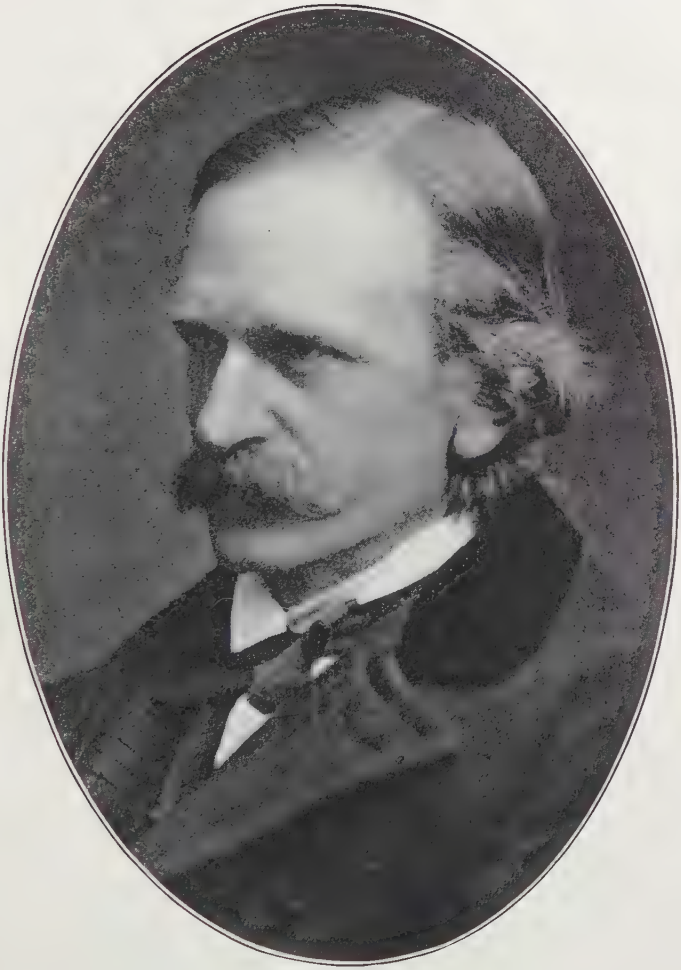
[1] Professor Taussig is author of a number of books, among them *Tariff History of the United States* (1886 and six later editions); *Some Aspects of the Tariff Question* (Harvard Economic Studies, ix, 1915); *Principles of Economics* (2 vols., 1911, and two later editions); *International Trade* (1927, German translation 1928). He has been President of the American Economic Association, editor of the Quarterly Journal of Economics since 1896, Chairman of the United States Tariff Commission 1917–19. — S. E. M.

[2] Sir William Ashley, as he became in 1917, took a First in Modern History at Balliol in 1881, and in 1888 published his pioneer work, *An Introduction to English Economic History and Theory.*

[3] A.B. Michigan 1890, PH.D. Berlin 1902; LL.D. 1918; Dean of the Business School, 1908–19, and as Director of the National Bureau for Economic Research responsible for a number of important investigations. See Dean Donham's chapter in this volume.



DUNBAR

YOUNG CARVER RIPLEY

THREE HARVARD ECONOMISTS

for the University soon took a wide range, but whose intellectual interests and achievements were greatest in his chosen field of economic history.

2. Growth and Expansion, 1900–28

In the opening years of the twentieth century the Department suffered a collapse. Dunbar died in 1900. Edward Cummings (A.B. 1883), whose appointment as Assistant Professor of Sociology in 1893 had marked another enlargement of the scope of Economics, resigned in the same year. Ashley resigned in 1901. For two years (1901–03) Taussig was compelled by ill health to withdraw from teaching. Some time passed before the department could be built up again to full strength. The successive appointments of Carver,[1] Gay, Ripley,[2] Bullock,[3] Day[4] filled the gaps. They made possible not only the maintenance and enlargement of the instruction for undergraduates in Harvard College, but the establishment and development of that offered to graduate students. This latter was part of the general growth of the Graduate School of Arts and Sciences, which was as distinctive a phase of the Eliot administration as was that of the other graduate schools: of law, medicine, theology, and business administration. So far as concerns economics, the credit for the fostering of graduate instruction belongs in no small part to Bullock, who became chairman of the Department in 1912. From the first he held in view the need of making a separate and well-defined offering to the graduate students specializing in economics, by segregating from the undergraduate courses a list designed for them. From small beginnings, regardless of pauses and relapses, he led the Department in this direction, and gradually established as part of the standing work of its staff the conduct of such instruction. In carrying out this policy, and in giving evidence of its results, the Department was aided by the publication of the Harvard Economic Studies, begun in 1906. This series of scholarly books and monographs, like the Quarterly Journal of Economics, took its place with the other activities of Harvard University in scientific research, and added to the imposing, almost forbidding, mass of printed material in which these bore fruit. The series of Economic Studies was made possible largely by the David A. Wells (S.B. 1851) bequest, which not only endowed a prize for an essay, but provided funds for its publication. Both essay and publication, like so many things in the history of Harvard University, came to be on a scale not dreamed of by those from whom the benefaction came.

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[1] Thomas N. Carver (A.B. Southern Calif. 1891, PH.D. Cornell 1894) came to Harvard in 1900 and has been David A. Wells Professor since 1904. A trenchant thinker and popular writer on economics, Carver is an important link between the University and the public. His principal works are *The Distribution of Wealth* (1904), *Sociology and Social Progress* (1905), *Principles of Rural Economics* (1911), *Essays on Social Justice* (1915), *Principles of National Economy* (1921), *The Present Economic Revolution in the United States* (1925).

[2] William Z. Ripley (S.B. Mass. Inst. Technology 1890, PH.D. Columbia 1893) has been Professor of Political Economy since 1902. His many works, reports, and articles on railways and other subjects have received national recognition by administrative appointments during the war, and by an appointment as adviser to the Interstate Commerce Commission in 1920. His principal works are *The Races of Europe* (1899), *Railway Transportation* (2 vols., 1912–15).

[3] Charles J. Bullock (A.B. Boston Univ. 1889, PH.D. Wisconsin 1895) came to Harvard in 1901 and has been Professor of Economics since 1908, on the George F. Baker Foundation since 1920. He has published numerous papers on the history of taxation, and has been a prime figure in the reform of taxation in Massachusetts.

[4] Edmund E. Day (S.B. Dartmouth 1905, PH.D. Harvard 1909), appointed Instructor in 1910 and Professor in 1920, accepted a professorship at Michigan in 1923; he is the author of *Statistical Analysis* (1925).

The Great War played havoc with this part of the University's work, as it did with all others. Taussig went to Washington in 1917 as chairman of the newly-established Tariff Commission, and during his official service was drawn into various fields of activity connected with the war. Gay and Day also were called to Washington for administrative and statistical work, which led in Gay's case to his being asked after the war to edit the New York Evening Post. Ripley was active in labor matters, smoothing the tangled relations between employers and employees in essential industries. Some years elapsed before matters again settled into working order. The appointment of Allyn A. Young[1] in 1920, and the return of Gay in 1924, aided in enriching the instruction and in re-establishing prestige. These later years were marked by a further development of advanced instruction and by a growth of departmental strength. It can be said with confidence that in this subject the first place among American universities was then conceded to Harvard.

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[1] Professor Young died in London on March 6, 1929. At the time of his death he was on leave of absence, having accepted a three-year appointment at the University of London. He was a distinguished scholar and writer, conversant not only with the whole range of economics but also with statistics, mathematics, philosophy; withal, a stimulating teacher and guide. Although he left no large body of written work, his influence on his contemporaries at Harvard and elsewhere was great and abiding.

In one important respect, however, there was failure to keep pace with the forward movement of economic science, namely, in the field of the social applications or implications of the subject. It is true that Cummings was appointed Assistant Professor of Sociology in 1893; true also that Carver gave systematic courses in theoretical sociology from the time of his appointment in 1901, and that Ripley gave courses in labor problems. But there was no coördination of all this with other disciplines, such as anthropology, psychology, and ethics, and little recognition of the way in which these might contribute to the understanding of economics or of the contribution economics might make to them. The University, needless to say, offered instruction in them, of high quality and wide range. Time and again it was suggested that there should be some unity and coördination, as well as enlargement, by the establishment of a Department of Sociology or of the Social Sciences, or at least by putting together under some such heading the various courses that might belong there. Yet nothing was done.[1] This halting and unsatisfactory situation was due in some part to the way in which the Department of Social Ethics grew up. Like economics, social ethics began as a constituent part of ethics and philosophy; it began, too, and continued, with a hortatory flavor supposed to be alien to the cold dry atmosphere of science. Whatever the cause, the result was unfortunate: a failure of the University to deal adequately with a set of interesting and pressing problems, and to meet a wide public need for sound advice and guidance.

Quite different in character was the establishment of the Committee on Economic Research, in 1917; rather an offshoot from the Department than a growth from within. The plan and the leadership in its execution belonged to Bullock; the statistical technique, both original and ingenious, was devised at the start by Professor Warren M. Persons. The gradual improvement of the technique, and especially that of the Index of Business Conditions, was due to a scientific staff which itself was gradually built up. This Harvard Economic Service (as it was commonly called) had two distinct aims from the start. The first was the dispassionate survey of current economic and business conditions by trained and competent observers, and the forecasting, within the limits of the possible, of coming business movements; the second, utilization of the accumulated materials and of the organized staff for the permanent enrichment of economic and statistical science. Nothing of the sort — the application of the highest scholarship under academic auspices to the perplexing oscillations and irregularities of modern trade and industry — had ever been tried before. As usual in the pioneering work of the University, this undertaking was supported in its early stages by contributions from donors who had faith in the experiment; a faith justified not only by the results achieved, but by early self-support. Notwithstanding a high scale of charges, and active competition from other organizations which attempted the same thing on a purely commercial or advertising basis, the Service secured for the first part of its work a clientèle of solid and intelligent business men, and a world-wide reputation among economists. Side by side with it went the second part, permanent contribution to the science of the subject, through the Review of Economic Statistics, established in 1918.

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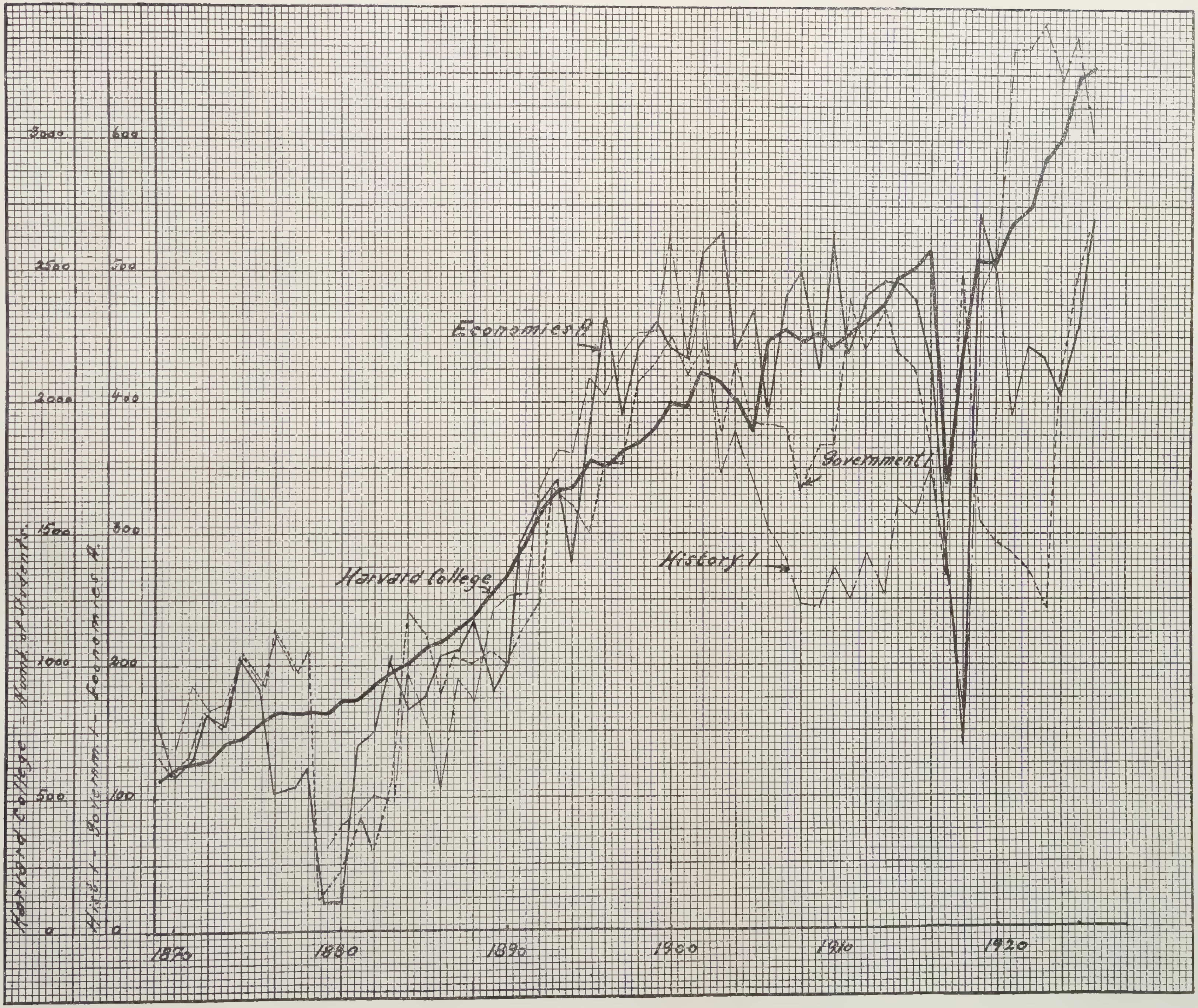
[1] See, however, Professor Ford's chapter on Social Ethics, below. S. E. M.

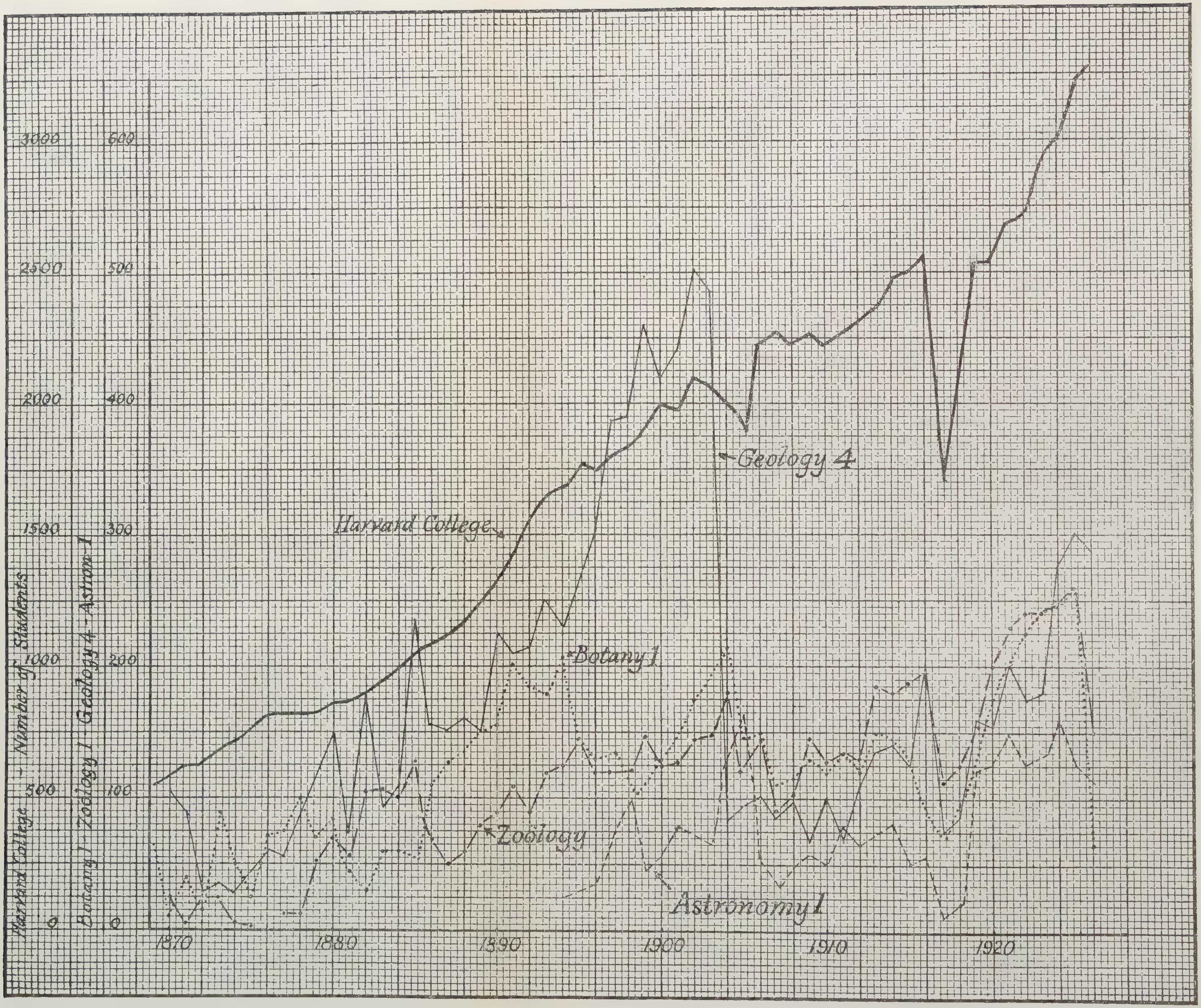
Flattering proof of the success appeared in many imitations, not only from commercial rivals, but, what was more significant, in the form of similar ventures in foreign countries, with similar academic connections. In England, France, Germany, and Austria, even in far-off Russia under the Soviet régime, institutions were set up on the same pattern, and in some cases (England and France) after consultation with the Harvard men and with substantial aid in money from the Harvard organization. The pioneering and leadership of the University has not often been so unquestioningly admitted in foreign lands. It was the business cycle that, as a rule, attracted attention to the Economic Service abroad. That subject had long engaged the attention of economists and writers on finance, and became especially prominent after the Great War, when it led in all countries to a veritable deluge of publications, good, bad, and indifferent. But the analysis and understanding of the business cycle was only a part of the Harvard Service. More was contemplated, in the way of contributions of permanent value to economic and statistical science, chiefly through the Review of Economic Statistics.

Questions not easily answered arose concerning the relation of the Economic Service to the Department, the School of Business Administration, and the Harvard Corporation. The President and Fellows were disengaged from any business re-



NUMBER OF STUDENTS ENROLLED IN THE INTRODUCTORY COURSES IN HISTORY, GOVERNMENT, AND ECONOMICS

1869–1926



NUMBER OF STUDENTS ENROLLED IN THE INTRODUCTORY COURSES IN THE SCIENCES

1869–1926

sponsibility, and from any complications as to the taxability of earnings, by formal incorporation of the Economic Service as *The Harvard Economic Society* in 1928.[1] As in most other matters of organization, the precise connection between the Service and the rest of the University was left to shape itself under the exigencies of the situation as it developed. So far as concerns the substance of the project, it can be said without hesitation that here was an achievement of unique character, a proof of intellectual initiative and of success in the realization of a fruitful plan.

3. Undergraduate Instruction

A different phase of departmental activities appears in the growth of instruction, and the new place of Economics in the undergraduate curriculum. The changes are part and parcel of the revolution (it is nothing less) which took place during the closing decades of the nineteenth century in the content of the American college curriculum.

The situation is best indicated by the number of students taking the introductory course, which took its definite shape in 1881.[2] Political Economy 1, Economics 1, Economics A, as it was called at successive stages, was designed throughout to give a survey of the subject; not theory or general reasoning alone, but applications to the realities of life and to current problems. It served the double purpose of an introduction to Economics for those who could continue with the subject, and a sufficient acquaintance for a liberally educated man. From that date it has been given continuously with about the same subject-matter. In 1881 it had 147 students; in 1891, 288; in 1896, 464. It was the gateway to the advanced courses, which also grew rapidly with the development of the elective system. By the close of the century the first course reached its level, so to speak, the number thereafter hovering between 400 and 500. The appended chart shows the marked upward sweep from 1881 to 1900.

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[1] The Committee on Economic Research continued as an organization for promoting the aims both of the Society and of the Department.

[2] Previously a half-course, prescribed at first for Juniors, after 1874 for Sophomores, was given until 1879. It was no less thin than the similar courses of the sixties. A last remnant of these petty scraps remained a year or two after 1879, an elective course of that character being offered in 1879–81; but it attracted small numbers and was soon given up. From 1881, the introductory course (Political Economy 1) became an elective running through the year, roughly the equivalent of what had been designated during previous years as Philosophy 6.

A similar movement appears, as the chart again shows, in the numbers taking the introductory courses in History and in Government. The same rapid growth took place in them as in the corresponding course in Economics. As the reader will again see, on turning to the chart, this was an unmistakably greater growth than that of the members in the College as a whole. Roughly stated, the total numbers in College doubled; the three introductory courses in the Division of History, Government, and Economics tripled.

All this, as has just been intimated, was part, and a large part, of the sweeping change which took place in the content and meaning of American college instruction. The elective system then did its main work. The backbone of the intellectual content of College work ceased to be Latin, Greek, Mathematics, and came to be the historical and political subjects and the modern languages, especially English. Natural science had its place also, and no small one; but not the place which the moderns and iconoclasts had looked for. It had been their expectation that free election would cause a resort to the natural sciences greater than in fact took place.[1] The main change was in the other direction. And it was not confined to Harvard College. The same overturn took place, and at about the same time, in all the colleges of the land. For good or ill, American college instruction took on an entirely different character.

The growth in the number of students taking courses in economics necessarily led to changes in the methods of instruction. Here again the march of events reflected what was taking place not only in Harvard College but in American colleges at large.

The change in teaching ways came slowly. Until about 1890 instruction was still in the main that of the good old days: a textbook, and recitations which were directed rather to ascertaining what the student already knew than to teaching anything he had yet to learn. The texts were indeed better than of old. One of the marked changes in the early part of Dunbar's career was the introduction of real books, by the then leading masters of the science. The recitation plan, with first-rate books, was not insusceptible of development into something better, especially in the more advanced courses, where lecture and exposition could supplement a careful study of great writings. But in the course for beginners there was a different problem, and a most difficult one. As numbers grew, the first step was the familiar one of dividing the students into sections; and for a time Laughlin and Taussig each conducted two sections, or four in all. The sections grew to fifty or sixty men, and became more and more difficult to handle.

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[1] Compare appended chart of elementary science courses. Although Geology 4 grew even more rapidly than the political courses, its growth was due partly to the personality of Professor Shaler, and partly to the absence of required work. When laboratory exercises were first required, the numbers fell off rapidly.

After Laughlin's resignation, a complete *volte-face* was made. The lecture plan was turned to, being the only one by which, under the financial limitations of the period, it was possible to do anything with the still growing numbers. The upper half of Massachusetts Hall, the third and fourth stories, was made into one large lecture room. The old partitions were removed, a small platform and desk was provided for the lecturer, and hard benches and seats for the closely packed undergraduates.[1] For years three lectures a week were given throughout the two terms, hundreds of undergraduates being addressed, exhorted, more or less instructed. It was bad teaching; not bad of its kind, perhaps, but the kind was bad. On some narrative parts of the subject, such as the financial history of the United States (in which there was still great public interest) it was not ineffective. But as regards reasoning on the fundamentals or an understanding of them, or stimulus to independent thinking, there could be hardly more than a pretense of 'putting it across' for the great mass of the undergraduate students. The arrangement was part of the then general trend toward lectures, largely an attempt to emulate the scholarly spirit of the Germans and an adoption of their ways; well-meant, and a step toward higher learning, but ill-adapted to the subject or to the students. Economics as a body of connected doctrine is eminently *not* teachable by lectures, except in its most advanced forms and to the most advanced students. An unbiased consideration of the results of the lecture system in Germany itself would have shown its sad defects for large groups. The evils, to be sure, were partly offset by the requirement that the students should read and understand good books. Something in the way of intellectual discipline and attainment was secured by the requirement, for example, of J. S. Mill's Principles, the leading book of its day and one not to be despised even in later days.

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[1] In 1902 the construction of the New Lecture Hall (still 'new' in 1929) made the physical conditions better for lecturers and hearers, removing the obstacles which had till then afflicted both.

Gradually breaks were made in the undiluted lecture plan. The device of having supplementary sections, for 'quiz' work by assistants, was first resorted to, and indeed was invented in this Department, spreading thence to a very large part of the College. The first change was to limit the lectures to two a week, a third hour being given to the section work. Next, in 1911, the lectures were cut down to one a week, while two meetings in sections were held; which evidently threw the emphasis and the main teaching responsibility to the sections. The Corporation, now under the leadership of President Lowell, was able to be more generous in its support, and made it possible to obtain the services of reasonably capable and well-trained instructors for the section meetings. Then finally came the tutorial system, and the far-reaching change in the whole organization of teaching in Harvard College. In the development of that system a commanding part was taken by Professor Harold H. Burbank (PH.D. 1915), who was chairman of the tutorial board for the Division from its foundation, and especially concerned with the selection of the tutors for the Department. Lectures in the initial course virtually disappeared — no more than a stray one here and there on some suitable topic. The instruction was given in small sections, about twenty-five students for each, under teachers as competent as could be got — mostly younger men, a selected group trained in the subject, apt for the work, and probably the better for being not too far from the students in age. They acted also as tutors for those concentrating in economics. Almost everything must depend on the quality of these men; and the Corporation, courageous under President Lowell's guidance, again provided funds which were not inadequate, and at all events, when combined with the prestige of the University, were sufficient to obtain men of personality as well as scholarly equipment. What will come next, who can say? The present generation does its best according to its lights; the coming generations will not fail to push on still farther and higher.

Analogous changes took place in the courses of the so-called middle group, though there they were less marked. The subject-matter being more largely of a narrative or informational sort, and often treated inadequately in printed sources, lent itself better to lecturing. Written work rather than discussion was the device for enlisting the active exercise of the students' faculties. The tutors became the important agents in stimulating intellectual interest through personal contact. It cannot be said that the problem of interlocking the two kinds of teaching, in courses and by tutors, was completely solved. Much remained to be learned and put into effect, in this department as in the others.

The teaching of the intermediate group of courses — those in the second group under the arrangement which has been maintained since 1891, designed 'for undergraduates and graduates' — presented difficulties similar in character, though perhaps not so pronounced. The subject-matter being more of a narrative sort, the lecture plan was less open to objection and indeed a considerable use of it was indispensable. By way of supplementing lectures, regular meetings were instituted in small sections under assistants, usually once a week, for oral discussion; the educational results varying inevitably according to the quality of the assistants. Written work, in the form of reports and theses, probably was of greater service to train the students in continuity and independence of thought and expression; a method also dependent on supervision by competent hands. The subsequent development of the tutorial system reacted, in economics as in all subjects, on these second-group courses. It offered large possibilities of combining stated instruction by lectures with personal attention and encouragement for the individual student; but the possibilities, in the judgment of the present writer, were far from being fully realized during the first decade of the tutorial system. Here, as elsewhere, while the unceasing progress and bold experimenting which characterized President Lowell's administration led to a brave start in new upbuilding, there was trial and error in the process of reconstruction. The final form which the courses of the second group should take could not be foreseen, least of all prescribed, in advance.

One aspect of the second-group courses in economics played a considerable part in the attitude toward them of undergraduates and of their parents and advisers. This was the notion that they were in the nature of business courses, and were specially helpful in training directly for active life. They offered instruction about money and banking, railroads and industrial organization, accounting, and statistics; what better introduction to the business career now entered by college graduates more than any other occupation?

In this expectation there was some truth but more error. The economist's point of view and his object are essentially different from those of the teacher of a profession. He is concerned primarily with the public aspects of his subject, not with its applications to the private fortunes of the individual; with what concerns us all, not with the success of any one. The difference in spirit between teaching economics and preparing for business is like that between biology and medicine, or between physics and mathematics on the one hand and engineering on the other. True, beyond doubt that is the best teaching for a profession which rests on thorough knowledge of science; there can be no hard and fast line, for example, between biological science and the medical art. But the aims are essentially different. The science would fathom the mystery of life in this universe of ours; the art would give insight and training for practical aid to the living human beings. The economist is interested in *his* universe, that of human society: in the way this society grows and develops and functions; but not in telling the individual how he can advantageously find his place in the complicated organism. When he discourses on trusts and railways, banking and finance, he is concerned with their significance for the well-being of all; and preserves also an interest in the phenomena which is of a purely scientific kind, like that of the biologist and physician in the chromosomes and the genes. So far as he undertakes to give advice, as inevitably he does (though sometimes he may pretend this is none of his affair), it is on the way in which regulation and legislation and public ownership, say, as against unfettered private business, will affect for good or ill the community as a whole. The teacher in a school of business, on the other hand, while he cannot be unmindful of the broad economic questions, after all is concerned chiefly with others of quite a different range: how best to organize and run a railway or a bank or a business, how to proceed within the limits set by the legislation that exists, how to work to most advantage in consonance with it.

As Dean Donham has narrated elsewhere in this volume,[1] the germs of business teaching and of the Graduate School of Business Administration are to be found in the Department of Economics; but the two ways of handling the close-related subject-matter were always different. It is on the whole not a matter for regret that the hopeful youths who elected economic courses were disappointed in finding that no keys were here supplied that opened the door to a fortune. What they experienced was a facing of great public issues such as they would have to deal with in mature life as citizens, legislators, and public officials. And in this experience they dealt with a set of topics that called for close reasoning, often of an abstract kind, as well as for adequate information and the application of informed common sense. Higher education consists of intellectual discipline and training for its use in a given field, combined with cultivation of the arts of expression and depiction. The teaching of any subject, economics as well as the others, is justified in the American and English college so far as it conduces to these ends.

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[1] See his chapter on the Business School, below.

X. ANTHROPOLOGY

1866–1929

By Roland B. Dixon, Ph.D.
Professor of Anthropology and Curator of Ethnology in the Peabody Museum

1. The Peabody Museum

ANTHROPOLOGY is the science of man, and has two very different aspects. The physical concerns itself with man's place in the animal kingdom of which he forms a part, with his differentiation into races, and with the complex problems of heredity. In this it follows the methods of the biological sciences, and is at various points and in various ways in touch with them. The cultural deals with the history of man's customs, beliefs, practices, and achievements, endeavoring to trace the origin and growth of every aspect of human culture from the earliest beginnings to the present, and to compare their manifestations among all types of mankind from the lowliest savage up to our modern selves. Archaeology contributes the essential historical data, whereas ethnography and ethnology supply the comparative materials. And just as on the physical side anthropology touches and interlocks with the biological sciences, so on the cultural side it is closely related to the historical and humanistic sciences. The scope of anthropology is thus very wide, since it includes virtually everything that is pertinent to the history of the human race.

In most branches of knowledge that are pursued in Harvard University, laboratories, museums, and libraries are the outgrowth of teaching and research. In anthropology, the order is reversed; and for the obvious reason that anthropology is so young a science that the overwhelming need was to discover and classify data, rather than to present conclusions which were purely tentative. Most of the significant history of anthropology has occurred since the Peabody Museum was founded in 1866. Only a decade had then elapsed since the discovery of the Neanderthal skull, and the full significance of the finds of stone implements in the gravels and caves of France and England was only just beginning to be generally accepted. The discovery of the Swiss lake-dwellings had but recently opened a new and alluring window into the past. Darwin's Descent of Man had been published but a few years, Broca and Quatrefages in France, Virchow in Germany, and Beddoe in England, were establishing physical anthropology upon a sound basis. Bastian and Waitz in Germany, and Tylor, in England, were laying the foundations on which much of the later ethnology was to rise.

Although the more observing and curious of the European colonists in America had from the sixteenth century taken an interest in the American Indian, and recorded data that are precious today, serious and scientific study of the native peoples of the continent could not begin until after the foundations of modern anthropology had been laid in Europe, and the importance of the vast field for investigation which America afforded had been realized.

Professor Othniel C. Marsh of Yale made the original suggestion for the establishment of a museum of American archaeology and ethnology. In the autumn of 1856, as a result of his work in excavating a shell-heap near Newark, N. J., he wrote to his uncle, George Peabody, in London, urging the importance and advantages of such an institution. Mr. Peabody had already in mind making certain gifts to Harvard and other universities, and was impressed with the value of Professor Marsh's suggestion. In June, 1866, he outlined a plan for such an institution to the Hon. Robert C. Winthrop in Boston. Mr. Winthrop discussed the proposed gift with President Walker, who felt that although the University was in great need of funds for other purposes, it should not attempt to urge the donor to divert his gifts to these needs, but accept the endowment for the purposes offered. On October 6, 1866, the deed of trust was signed, conveying to a board of trustees the sum of $150,000 for the endowment of a 'Museum and Professorship of American Archaeology and Ethnology in connection with Harvard University.' The President and Fellows having formally accepted the terms of the trust[1] on October 16, the funds were paid over to the trustees on November 3, 1866, and within a week the Museum was started by placing some fifty specimens in a case in the

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[1] The terms of the trust instrument provided that the endowment be divided into three parts, $45,000 for a fund the income of which was to be used for the acquisition of collections, an equal sum to establish a professorship, and $60,000 for a building fund which was to accumulate until it reached at least $100,000.

Museum of Comparative Anatomy in Boylston Hall. Part of these specimens were already the property of the University and part belonged to Professor Jeffries Wyman, who was appointed the first Curator.

The growth of the collections in the new museum was rapid. Within a very short time the valuable ethnological specimens in the possession of the Boston Athenaeum and the Massachusetts Historical Society, gathered on the Pacific Coast and in the South Seas in the latter part of the eighteenth and early nineteenth centuries, were donated by these organizations; the Smithsonian Institution added further gifts from the same area; and an important collection made by Ephraim G. Squier in Peru was received as a gift from the collector. Other series of archaeological objects from Mexico and Denmark were purchased. Field-work was begun by the Curator by the exploration of shell-heaps in New England and Florida, and Berendt was engaged to make collections in Mexico and Central America. At the end of its first year, the Museum had thus laid a broad foundation for its future work.

During the second year literally priceless material was acquired: the private archaeological collection of Gabriel de Mortillet, father of archaeology in France; the Rose collection of several thousand specimens illustrating Danish archaeology; one of the great classical collections from the Swiss lake-dwellers, made by Clement, their discoverer. The great importance of these collections lies in the fact that the exportation of archaeological materials from those areas has long been practically forbidden, so that today they could not be duplicated. The De Mortillet collection, moreover, comprises many of the type specimens used by the great French archaeologist to illustrate his well-known work *Le Préhistorique*.

During the next four or five years the collections of the Museum continued to grow, by the gift of specimens, such as those received from the Boston Marine Society; by further purchases, such as that of the famous Lartet and Christy collections from France and that of Nicolucci from Italy; and as the result of explorations in shell-heaps along the Atlantic Coast, in the gravels of Trenton, N. J., the mounds of Ohio, Kentucky and Tennessee, and farther afield in Peru and Brazil.

Wyman died in 1874, and Asa Gray was appointed Curator *pro tem*. As his other duties left him scant time to attend to the

Museum, he secured the services of Frederic Ward Putnam (S.B. 1862), who was appointed Curator in 1875. Putnam had been a student of Louis Agassiz, and had been associated with Wyman for some years in his field-work, as well as carrying on his own investigations in the mounds.

The building fund now having reached the figure set by Mr. Peabody, the trustees were assigned by the University a plot of land on Divinity Avenue back of the Agassiz Museum, and proceeded to erect a museum building. Construction started in July, 1876, and the building was completed and the collections transferred from Boylston Hall the following year. The remainder of the building fund was so wisely invested that in 1888, when quarters had again become cramped, the trustees were able to construct an addition to the Museum building nearly doubling its size. This was completed and opened in 1889.

The Museum became an integral part of Harvard University on January 1, 1897, when the trustees, by virtue of an enabling act of the legislature, conveyed all the property to the Harvard Corporation. The trustees then became the Faculty of the Museum, charged with its administration and control. The Faculty appoints and the Corporation confirms the Director, Peabody Professor, new members of the Faculty, curators of separate sections of the Museum, and holders of fellowships and scholarships. Instructors in the Division of Anthropology are not *ex officio* members of the Museum staff; but most of them are appointed curators in their special fields.

The publications of the Museum began in 1868 with the Annual Reports which included brief statements of the collections and explorations. Beginning in 1876 short articles and monographs were included in the Reports. This arrangement proving unsatisfactory, the 'Papers of the Peabody Museum of American Archaeology and Ethnology' began to appear in 1888, as a medium of publication for students and staff. This series was supplemented by the 'Memoirs of the Peabody Museum of American Archaeology and Ethnology' in 1896.

From the beginning the Museum had been carrying on exploration, but the available resources were small. Therefore in 1882 the Curator sent out a public appeal for funds for this purpose. The request met with an immediate response, which enabled the Museum to undertake larger plans of work in Ohio, among the Indians of the Plains, and in Central America. In

1891 the first of a long series of expeditions was sent to Central America, carrying out at Copan in Honduras, the first extensive excavations made at any Maya site. The Mary Hemenway Southwestern Expedition brought the Museum important archaeological and ethnological collections in 1894. At the same time it continued to acquire valuable specimens from other institutions, notably the ethnological collections of the American Antiquarian Society, comprising many very old objects from the Pacific Coast, and of the Boston Museum, including a portion of the collections made by Lewis and Clarke. Charles Pickering Bowditch (A.B. 1863) in 1890 made the first of a long series of generous gifts, which have continued through the kindness of Mrs. Bowditch up to the present time. These donations have made possible the purchase of collections, extensive explorations in Mexico and Central America, and the publication of the results.

The years that followed saw the steady growth of the Museum collections, and their increasing use by students. In 1906, through the aid of Louis de Milhau (A.B. 1906), an expedition under the leadership of Dr. W. C. Farabee of the Division of Anthropology left for Peru, and in the course of three years in the field added considerably to the Museum's collections from that region.[1]

In 1909 Professor Putnam, who had served as Curator for almost thirty-five years, resigned, and was appointed Honorary Director. He continued, however, to give a great deal of his time to the affairs of the Museum, the general care of which was in the hands of Charles C. Willoughby, who had been appointed Assistant Curator ten years before. The building had, however, been outgrown again, and Putnam was tireless in his endeavors to obtain the necessary funds for a further addition which should complete the building originally planned by Agassiz, by connecting the Peabody Museum with the geological section of the University Museum. His efforts were at last successful, and in 1914 the connecting link was completed, again nearly doubling the available space.

Putnam did not long survive the fulfillment of his great ambition, for he died the following year. His forty years of untiring and unselfish devotion to the Museum had built it up from small beginnings to one of the great anthropological museums of the country. For although it had been founded primarily as a museum of American Archaeology and Ethnology, he had wisely widened its scope, as the deed of trust permitted, so as to include collections from the entire world. Great though his services were to the Peabody Museum, they were not confined to it alone. As Director of the Anthropological Section of the Chicago Exposition in 1893, he aroused a wide interest in the young science by the remarkable exhibits brought together under his direction: exhibits which became the nucleus of the great collections of the Field Museum in Chicago. Later, when by special arrangement he was made Curator of Anthropology in the American Museum of Natural History, dividing his time between Cambridge and New York, he gave a great impetus to the work of that museum in the anthropological field, and gathered under him a notable and strikingly able group of investigators. Again in 1903, when the University of California initiated work in anthropology, he gave part of his time to its planning and administration. His influence thus extended literally from coast to coast, and his services to anthropology in this country were very great.

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[1] Dr. Farabee's report, *Indian Tribes of Eastern Peru*, is printed as Volume x of the *Papers of the Peabody Museum.*

Putnam's successor as Director of the Museum was Charles C. Willoughby, who since 1894 had been responsible for the larger part of the installation and arrangement of specimens.[1] Samuel J. Guernsey, who had been an assistant in the Museum since 1909, was appointed Assistant Director. Since Putnam's death the Peabody Professorship has remained unfilled.

Just prior to Putnam's death, Oric Bates (A.B. 1905), a keen student of African peoples, had been appointed Curator of African Archaeology and Ethnology, and at once began to build up the Museum's collections in that field. Through his efforts, not only were these greatly increased, but a new publication of the Museum, the Harvard African Studies, was begun in 1916. Mr. Bates's death in 1918 was a great loss to the Museum, but his widow generously provided for carrying on both fieldwork and publications.[2]

[1] Willoughby has published in the *Papers of the Peabody Museum* a number of monographs, of which the more important are 'Prehistoric Burial Places in Maine' in vol. i; 'Indian Village Site and Cemetery near Madisonville, Ohio,' 'Notes on the Artifacts,' and 'The Turner Group of Earthworks,' in vol. viii.

[2] Memoirs by A. C. Coolidge, at beginning of *Harvard African Studies*, vol. ii (1918), and by M. A. DeWolfe Howe, in *Memoirs of the Harvard Dead*, iv, 547–566.

In 1913 the Museum staff was further strengthened by the appointment of Dr. Alfred V. Kidder (A.B. 1908) as Assistant Curator, first of North American Archaeology and later of Southwestern Archaeology. His wide knowledge and experience in that field have made him a great asset to the Museum, both as adviser, and as organizer and director of numerous important expeditions. Much of the credit for the application of modern methods of excavation which have brought order and sequence into the prehistory of the Southwest, has been due to Kidder; and his excavations, in association with Guernsey, have brought to light the most important and largest collection of materials relating to the Basket-maker culture of that region, the oldest that has hitherto been revealed to us in any completeness, in any part of the New World.[1] Dr. Herbert J. Spinden (A.B. 1906), appointed Curator of Mexican Archaeology and Ethnology in 1921, by his expeditions in the Maya area and his penetrating studies of their art and their calendar system has established firm foundations for all future work on the culture of that gifted people.[2]

Willoughby retired in 1928, and was appointed Director Emeritus. Dr. Edward Reynolds (A.B. 1881) was chosen to succeed him. The long years of devoted service which Willoughby gave to the Museum have borne fruit in the admirable and artistic installation of the collections, for which he is in large measure responsible, and which has given the Museum an enviable reputation. To his skill in museum technique and keen judgment of the value and genuineness of specimens the present effectiveness of the collections is mainly due.

The Peabody Museum was the first definitely anthropological museum in the United States, and it has been developed with a purpose and on lines somewhat different from those prevailing in other great museums in the country, which have come to include anthropological exhibits of imposing extent. Unlike these, it was from the first a university museum. While the public has always been welcomed, the value and importance of the Museum to the University and its students has always been kept in mind. Popular exhibits designed to attract and interest the general public have thus not been favored, but more attention has been given as a rule to displaying representative collections from as many different tribes and peoples as possible. Instead of attempting to prepare a few life-sized house and industrial exhibits, the policy has been adopted of representing a large number of different peoples by means of small models. These models, by the aid of Guernsey's artistic skill and ingenuity, have made it possible to show a far greater variety of occupations and details. With the growth of instruction in Anthropology in the University, an increasing use of the Museum's collections has been made by students, who in many of the courses now offered are required to study and report on specific topics or collections, thus supplementing the lectures and reading by first-hand observation and comparison. The appeal to the public has also increased, and the annual number of visitors is now estimated at about ten thousand. During the last few years, increasing use of the Museum has been made by the children in the Cambridge public schools.

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[1] See Kidder's *Introduction to the Study of Southwestern Archaeology* (1924); Guernsey and Kidder, 'Basket-maker Caves of Northeastern Arizona,' *Papers*, vol. viii.

[2] Spinden's doctoral dissertation was published in 1913 as 'A study of Maya Art,' *Memoirs of the Peabody Museum*, vol. vi. His remarkable elucidation of the Maya calendar, 'The Reduction of Mayan Dates,' is printed in the *Papers*, vol. vi (1924).

The importance of a library as an adjunct to the Museum was realized from the first. The Museum funds have never allowed more than a pitiable annual appropriation for the purchase of books, so that the growth of the Library has been mainly due to exchange of publications, and to gifts of books or of money to purchase them. John B. Stetson, Jr. (A.B. 1906) has for many years made the Library an annual contribution for this purpose. Professor Putnam wisely distributed copies of the Museum publications to a long list of institutions and persons working in the anthropological field, with the result that the Library has received by exchange complete sets of nearly all anthropological publications. For books dealing with anthropology the Museum staff and students have had to rely largely on the great collections in the University Library; but the Museum has built up a very useful working collection. Dr. Lombard C. Jones (A.B. 1887) has given many hundreds of volumes. The most important gift, however, came from Charles Pickering Bowditch, who gave to the Library his own valuable series of books on the Maya field, including several hundred volumes of photostatic copies of very rare works and manuscripts. But the value of the Library to students lies less in its twenty thousand books and pamphlets than in the completeness of the card catalogue, which amounts to an index of the entire periodical literature of anthropology. This card catalogue, now numbering over 125,000 cards, lists under authors and subjects every article in all anthropological publications, forming a unique bibliographical tool for research students.

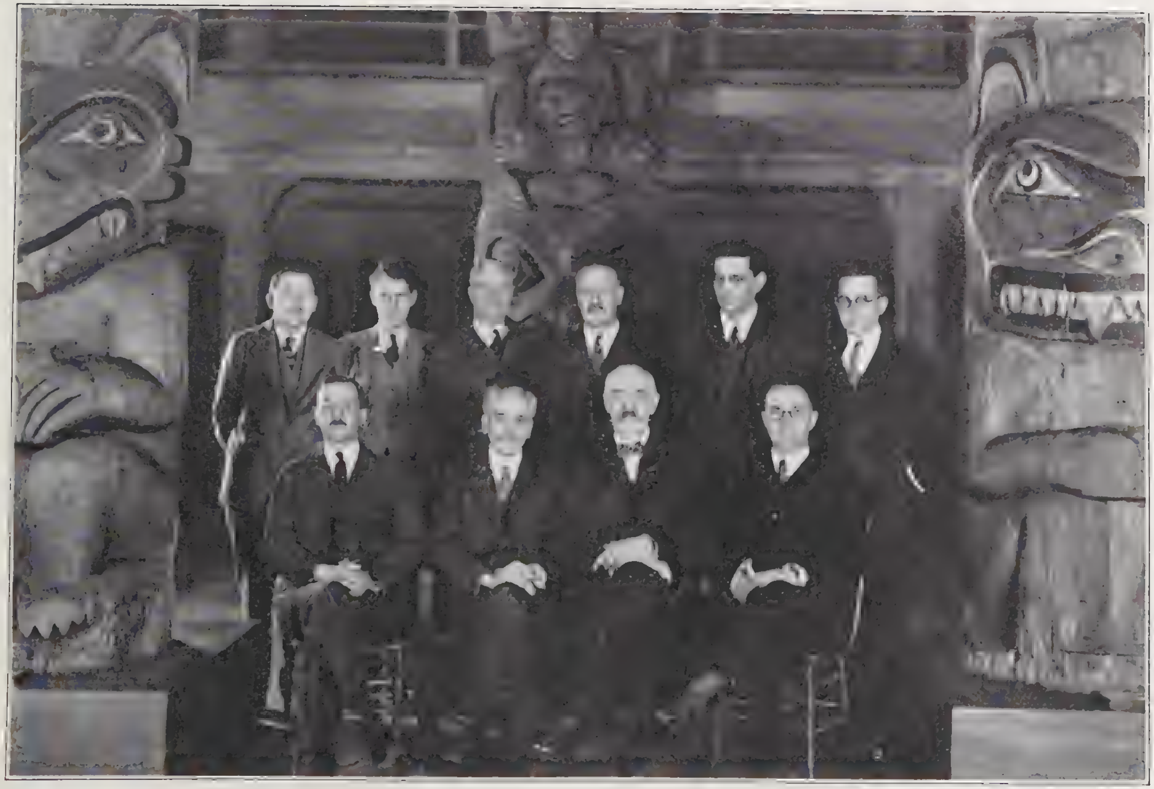
Parallel to the Library as a research adjunct to the Museum, is its large collection of crania and skeletal remains. From the beginning the Museum acquired materials of this sort from its excavations. These have been supplemented by the purchase of collections from various parts of the world, and in recent times have been notably increased through the efforts of Professor Hooton, of the Division of Anthropology, who is Curator of Somatology in the Museum. The collection of crania now numbers about eight thousand specimens, so that it takes rank as one of the great collections in America, and far exceeds in size that possessed by any other university in the country.

The list of donors who have rendered valuable aid to the Museum is a long one, and it is difficult to select the few names for which space is here available. Apart from those already noted, mention should be made of Mrs. Mary Hemenway, who in addition to large collections gave also a generous fund for archaeological work; Augustus Hemenway, (A.B. 1875) who over a period of a quarter of a century has given freely to meet the Museum's needs; Stephen Salisbury (A.B. 1832), Clarence B. Moore (A.B. 1873), J. Huntington Wolcott, Henry C. Warren (A.B. 1879) and Miss Susan C. Warren, donors of funds for collections and exploration; Lewis H. Farlow, Dr. A. Hamilton Rice (A.B. 1898) and the Duke of Loubat.

2. THE TEACHING OF ANTHROPOLOGY

Mr. Peabody's fund was designed for the 'foundation and maintenance of a Museum and Professorship of American Archaeology and Ethnology'; and although Putnam offered a short course of public lectures from time to time, nothing was done toward a professorial chair until June, 1885, when the trustees voted to establish the Peabody Professorship, and nominated the Curator of the Museum for that position. The Corporation immediately made the appointment, but confirmation was held up by the Board of Overseers, at the instance of Alexander Agassiz, until 1887. By that time Harvard had lost to Pennsyl-

FREDERIC WARD PUTNAM



Standing: Hooton, Coon, Spinden, Kidder, Wulsin, Guernsey *Seated:* Tozzer, Willoughby, Reynolds, Dixon

FACULTY OF THE PEABODY MUSEUM

1928

vania the honor of being the first American university to establish a chair of American Archaeology.[1]

Tardy as the confirmation was, it preceded the actual need of instruction; for apart from auditors to his public lectures, only a few graduate students came to Professor Putnam until 1890. In December of that year the Faculty of Arts and Sciences established the Division of American Archaeology and Ethnology; and in 1891 Mrs. Mary Hemenway and Mrs. Mary Copley Thaw each founded a fellowship for a graduate student in that subject. The first doctorate in the Division was given three years later to George A. Dorsey (A.B. 1890), who had carried on archaeological investigations for Professor Putnam in Peru, in connection with the Anthropological Section of the Chicago Exposition. In 1894–95 the first regular course in General Anthropology was offered, primarily for graduates but open to undergraduates by permission. In this course Dr. Dorsey served as assistant, and was appointed instructor for the following year. He resigned shortly after to accept a position at the newly founded Field Museum in Chicago, and his place was taken by Frank Russell (A.B. 1896), who although but twenty-eight had been engaged for several years in anthropological field-work among the Indians of the lower Mackenzie Valley, under the auspices of the University of Iowa. In 1897 a special course in American Archaeology and Ethnology, and advanced courses in Somatology or physical anthropology were added. The staff of the Division was enlarged by the appointment of Roland B. Dixon (A.B. 1897)[2] as assistant. The next two years saw further increase in the number of courses offered.

Dr. Russell, whose health had been injured by his two years' explorations in the arctic regions, was obliged to leave in the spring of 1901 for Arizona. He returned in 1902 to take up his work once more, seemingly greatly improved in health, but the New England climate proved fatal, for he had to go back to Arizona hurriedly the following spring, and died there in November. Russell's five years of service in the Division had come at the critical period in its early beginning, and to his wholehearted devotion to his subject and quietly efficient yet inspiring teaching, the steady growth of the Division during these years was in no small measure due.[1] The vacancy was filled by the appointment of Dr. William C. Farabee (A.M. 1900). Although he had turned to the study of anthropology somewhat late in life, Farabee had thrown himself into his work with zeal, and his kindliness and genial manner quickly attracted students.

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[1] Daniel S. Brinton was appointed Professor of American Archaeology and Linguistics in the University of Pennsylvania in 1886.

[2] Among Dr. Dixon's published works during his thirty-year connection with the Museum and the Division are *Maidu Myths* (1902), *The Chimariko Indians and Language* (1910), *Maidu Texts* (1912), *Oceanic Mythology* (1916), *Linguistic Families of California* (1919), *The Racial History of Man* (1923), *The Building of Cultures* (1928). S. E. M.

By this time the instruction in the Division, like that in the Museum, had grown far beyond the relatively narrow limits of its title. Seven regular courses and half-courses covering a wide field, were being given. It was time to change the title of the Division of American Archaeology and Ethnology to the Division of Anthropology, representing its real scope. To this the Faculty of Arts and Sciences consented, and in 1903 the change was accordingly made.

In 1905 the staff of the Division was increased by the appointment as Instructor of Dr. Alfred M. Tozzer (A.B. 1900), who for several years had been Assistant in Central American Archaeology in the Museum.[2] During two of Farabee's three years' absence as leader of the Museum's expedition to Peru, instruction in the field of European Archaeology was given by Dr. Charles Peabody (A.M. 1890). In 1907 for the first time, a course in Anthropology was given in the Summer School.

Professor Frederic Ward Putnam joined the Emeriti in 1908. For several years he had ceased to give any regular instruction, and had confined himself to work with a few graduate students. In the beginning he had fought for the recognition of the young science of anthropology by the Faculty of Arts and Sciences; had wisely fostered the Division's growth; and by his enthusiasm and lovable personality had attracted students into the new field. To him anthropology owes much, and not alone in Harvard, for, as has been pointed out, his influence spread across the whole continent.[3]

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[1] Memoir by F. W. Hodge in *American Anthropologist*, n. s., v, 737–738; obituary notice in *Iowa Alumnus*, December 15, 1903.

[2] Author of *A Comparative Study of the Mayas and Lacandones* (1907); 'Animal Figures in the Maya Codices,' *Papers*, vol. iv; 'A Maya Grammar,' *Papers*, vol. ix; *Social Origins and Social Continuities* (1927).

[3] Memoirs by Franz Boas in *Science*, n. s., xlii. 330–332; by A. L. Kroeber in *American Anthropologist*, xvii, 712–718; by Charles Peabody in *Zeitschrift für Ethnologie*,

In 1908 Dr. Farabee returned from Peru and resumed his work in the Division. In 1913, however, he resigned to accept a position in the Museum of the University of Pennsylvania,[1] and Dr. Earnest A. Hooton was appointed to take his place. Dr. Hooton had studied anthropology at Oxford, and brought new points of view which were of great value to the Division.[2] Criminal anthropology is one of his specialties. For the next five years the instruction given in the Division grew steadily in volume, until in 1917–18 eight and one half full courses were offered, together with five '20' courses for individual research.

As in all departments of the University, the Great War had the effect of cutting down the number of students, and depleting in one way or another the ranks of the teaching force. Dr. Hooton, unable to enter government service on account of defective eyesight, was the only member of the Division left in Cambridge.

The five years following the war were marked by no special events. In 1924–25 the Division adopted the tutorial system, which had been in use in several other departments of the University for some time. The experience of the last four years has convinced the members of the Division of the great value of this system. The field covered by anthropology is so wide and many-sided, its contacts with other sciences and subjects are so numerous, that a tutor can aid the student more perhaps than in most other disciplines to get the proper perspective and correlate the information obtained and conclusions reached in different courses. In 1927 a further innovation took place, which it is hoped may prove of considerable value. The members of the Division had felt for some time that the use of satisfactory moving pictures might be of large help in the teaching of anthropology. If films could only be secured which adequately illustrated the life of savage and foreign peoples, not only could the ethnographical courses be made more vivid and effective, but it would be possible to bring out, far more clearly than in any other way, the various techniques of weaving, pottery-

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xlvii, 391–393; by Paul Rivet in *Journal de la Société des Américanistes*, n. s., xi, 643–654. See also the *Putnam Anniversary Volume of Anthropological Essays*, presented to him on his seventieth birthday, April 16, 1909.

[1] Dr. Farabee died in 1925. See memoirs in *Penn. Univ. Museum Journal*, xvi, 77–80; *Art and Archaeology*, xx, 92–96; *American Journal of Physical Anthropology*, xiii, 452.

[2] Author of *The Ancient Inhabitants of the Canary Islands* (1925) and *The Indians of Pecos* (1929).

making, metal-working, and other arts and industries. Largely through the aid and enthusiasm of John A. Haeseler (A.B. 1923), a former student in the Division, an arrangement was made whereby a large amount of existing film has been examined, the useful parts cut out and put together, and several films prepared which promise to be of real educational value. Furthermore, an independent organization has been set up, which expects to take special films under the direction of the Division.

In looking back over the history of what is one of the youngest divisions of the Faculty of Arts and Sciences, one cannot but feel that in its barely forty years of existence it has had a healthy and satisfactory growth. From one informal course in 1890–91, given by a single instructor, the offering has grown to eighteen half-courses, two full courses and seven '20' courses, given by three professors with competent assistance. From the three enrolments in the first year, the number has increased to nearly four hundred and fifty. From the limited field of American archaeology and ethnology it has expanded over the whole field of anthropology with a completeness unmatched, it is believed, by any other university in the country. To it have come students, not only from all parts of the United States, but from Mexico, South America, South Africa, Europe, Japan, China, the Philippines, and India; and its graduates, twenty-two of whom have taken the degree of Doctor of Philosophy, hold or have held important academic and research positions widely in this and other countries. These men have carried on field research throughout the length and breadth of America, from North Africa through the Congo to the Cape, from Siberia, Mongolia, Tibet, China, and Japan to India and Arabia, and throughout the great island world of the Pacific and Malaysia.

In other words, the teaching of anthropology has expanded with the growth of science; and the science in America has owed no small part of its growth to the Museum and the Division.

The picture presented by anthropology today is in great contrast with that of 1866. Our knowledge of the physical characteristics of early man rests not upon a single skull, but on a great body of skeletal material attributable to various periods and coming from nearly all parts of the world. The meagre data on the physical characteristics of the various human races have grown to great accumulations and collections, among which those of the Peabody Museum hold an honored place. The recent publication by Professor Hooton on the skeletal remains from Pecos, New Mexico, is based upon something over a thousand individuals — a larger series from a single area than has ever before been available in the New World; and his forthcoming study on criminal anthropology rests on detailed measurements and observations taken on nearly twenty thousand individuals in various parts of the United States.

Archaeology has, in the last half century, unearthed immense collections of man's handiwork in stone, pottery, bronze, and iron from almost every corner of the world, enabling us to trace his achievements with a certainty and in a detail undreamed of at the time the Museum was founded. It has revealed that the New World has played a part of surpassing interest in the history of man's development, and here Harvard has come to the fore. The pioneer work in the Maya region of Central America was undertaken by expeditions sent out from this Museum, and indeed every member past and present of the Museum staff and the Division has made some outstanding contribution along archaeological, ethnological, somatological, or linguistic lines. These men are giving freely of their knowledge and their enthusiasm to growing numbers of pupils, and at the same time are pushing eagerly their quest for the laws that govern the ways of mankind. They may take a just pride that Harvard University has been so prompt and forward in this new field; and hope that the progress made in the last half century is but an earnest of that which is to come.

XI. PSYCHOLOGY

1876–1929

By Ralph Barton Perry, Ph.D.
Professor of Philosophy

1. Relations of Philosophy and Psychology

HARVARD is almost the only American university in which Philosophy and Psychology still constitute a single department. Until nearly the close of the last century psychology was generally regarded as a branch of philosophy. As it became more definitely scientific in its aims, and began to employ experimental methods, it established close relations with physics and biology, and found the alliance with philosophy less useful and less congenial.

The separation which took place elsewhere was postponed at Harvard for essentially personal reasons. Harvard's psychologists were, as a rule, philosophers, and her philosophers also psychologists. James, who inaugurated psychology at Harvard, lent rather than gave himself to the subject. Münsterberg, whose advent was expected to sharpen the cleavage with philosophy, maintained a lively interest in that subject, and was as definitely committed to a 'system' as were his philosophical colleagues. In later years the same was true of Holt, and, in less degree, of McDougall. Royce wrote a textbook on psychology and even indulged in laboratory experimentation. Meanwhile younger men had grown up in this atmosphere, and habits of association had been formed among both students and staff. There has also been a more or less definite conviction that every philosopher ought to have *some* psychology, in order to cultivate his scientific side; and that every psychologist ought to have *some* philosophy to cultivate his theoretical side.

Nevertheless the divergence between philosophy and psychology has steadily widened. The Laboratory requires a different set of aptitudes from those which commonly prevail among philosophers. As the content of psychology itself has increased, and as its relations with other sciences have grown important, the time and attention which a psychologist can devote to philosophy have correspondingly diminished. The demand in the teaching market is for experimental rather than for theoretical or empirical psychologists. It has proved desirable for many years to formulate different requirements for the doctor's degree; and the requirements now have little in common. The same is true of the undergraduate requirements for 'concentration' and for Honors. The Laboratory, under its director, has acquired greater and greater autonomy. In 1913 it was found desirable to adopt the name Psychology (instead of Philosophy 2, 13, etc.) for courses in that subject, and to include this name in the title of the Department. At present, therefore, the connections between Philosophy and Psychology are mainly those of administration, counsel, and personal association, and imply little identity in the content of instruction or research.

2. THE PSYCHOLOGICAL LABORATORY

Harvard has played an important rôle in the development of experimental psychology in America. When the first psychological laboratory was established, is a question which is incapable of definite settlement, because it is impossible to determine either just when a physical or physiological laboratory, through attention to psychophysics or physiological psychology, becomes a *psychological* laboratory; or just when a collection of instruments collected and used for demonstration or research in psychology becomes a *laboratory*. William James, as early as 1867, while still prosecuting his medical studies, made contact in Germany with Helmholtz, Hering, Wundt, and others who were developing the field of psychophysics and physiological psychology. It seems probable that the graduate course on the Relations between Physiology and Psychology, which he inaugurated in 1875, was the first course on that subject given in this country; and in the following year James offered a course for undergraduates (Natural History 2) on the same subject.

James's undergraduate teaching of Psychology was in the main from texts, such as Spencer, Bain, and Taine, but from the beginning he made use of apparatus for classroom demonstrations, and employed experimental technique in his advanced instruction. For these purposes he fitted up two rooms in Lawrence Hall, then occupied by the Lawrence Scientific School. The exact date of his installation there is doubtful, and in any case it was not his first place for experiments of the sort. G. Stanley Hall, referring apparently to the middle 'seventies, wrote: 'In a tiny room under the stairway of the Agassiz Museum he [James] had a metronome, a device for whirling a frog, a horopter chart and one or two bits of apparatus.'[1] Hall's own researches, in preparation of his doctor's thesis on The Muscular Perception of Space, were carried on in the physiological laboratory of Dr. H. P. Bowditch at the Medical School, North Grove Street, Boston; and James also made frequent use of this laboratory as early as 1872.[2] It seems probable that the installation in Lawrence Hall took place either in 1876–77 when the undergraduate course in Physiological Psychology was inaugurated, or in the following year when James was transferred to the Department of Philosophy.[3] The laboratory remained in Lawrence for many years. There are references in James's unpublished correspondence to 'experimental investigations' of his own in 1883, and to a 'laboratory for psychophysics' in 1885, both references being presumably to Lawrence Hall. In any case, during the year 1890–91, finding these quarters overcrowded, James raised $4,300 for new equipment and facilities, and in the autumn of 1891 moved into Dane Hall. The improved Laboratory there was in good running order, with Dr. Herbert Nichols installed as laboratory assistant, when Münsterberg arrived to take charge in September, 1892.

Meanwhile Stanley Hall had received his doctor's degree under the Department of Philosophy in 1878, having been closely associated with James in the study of Physiological Psychology, and being examined for his degree by a committee composed of Bowen, Hedge, Bowditch, Everett, James, and Palmer. He then repaired to Leipzig, where he worked in the new psychological laboratory established by Wundt in 1879. Hall became Professor of Psychology at Johns Hopkins in 1882, and there established a well-equipped laboratory in 1883. About five years later, owing to the influence of Harvard and Hopkins,

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1. *Life and Confessions of a Psychologist* (1923), p. 218. Professor E. L. Mark states that in connection with the instruction which James gave in Physiology and afterwards in the Comparative Anatomy and Physiology of Vertebrates, he used a small room in the University Museum. This would have been between 1872 and 1876.

2. *Letters*, i, 167.

3. James himself, writing, in 1895, said, 'I, myself, "founded" the instruction in experimental psychology at Harvard in 1874–75, or 1876, I forget which.' — *Science*, n. s., ii, 626, 735.

and to the studies of American psychologists in Germany, laboratories began to multiply rapidly. By 1900 there were twenty-five or more in American universities. In 1905 the Harvard Laboratory was removed to Emerson Hall, where it has since occupied the entire third and fourth floors of the building. This was one of the first, if not the first, psychological laboratory originally designed and built for the purpose.

Hugo Münsterberg, a former student of Wundt, was called from Freiburg in 1892. This appointment grew out of the fact that James desired to promote experimental psychology at Harvard, but was unwilling to direct it himself. Münsterberg's first Harvard appointment was for a limited term of years, and in 1895 he returned to a professorship at Freiburg, James resuming charge of the Laboratory with the assistance of Professor Delabarre of Brown University and Dr. E. A. Singer, Jr., now at the University of Pennsylvania. The permanent appointment of Münsterberg dated from 1897, and in 1909 he became the first official 'Director of the Psychological Laboratory.' During these first years, he was assisted by Robert McDougall (A.M. 1893) and James E. Lough (A.B. 1894), both of whom later became professors at New York University. E. B. Holt (A.B. 1896) and R. M. Yerkes (A.B. 1898) entered the Department in 1901 and 1902, and remained, much to its profit, sixteen years. After their resignations, the directorship of the Laboratory was assumed by Herbert S. Langfeld, who had been teaching psychology at Harvard since 1910. Langfeld resigned in 1924 to take charge of the new psychological laboratory at Princeton. Meanwhile Edwin G. Boring, who had been called from Clark University in 1922, succeeded to the directorship of the Laboratory. The staff in experimental psychology was augmented in 1916–22 by two younger men, Leonard T. Troland (A.M. 1914) and Carroll C. Pratt.

Psychology, like Philosophy, has benefited by the increasing number of younger men who have from year to year served as tutors or assistants, and by the visits of temporary lecturers from other universities, such as Wolfgang Köhler of Berlin, 1925–26, Karl Bühler of Vienna, 1927–28, Edward S. Robinson of Chicago, 1926–27, and Walter S. Hunter of Clark University, 1927–29.

3. Instruction and Research

While the frequent changes of personnel since 1892 have no doubt been prejudicial to results of the sort that follow from unified and consecutive effort, the Harvard Psychological Laboratory has been distinguished by its initiative and by the diversity of its activities. When Münsterberg was appointed in 1892 his interest lay in the application of experimental, introspective methods to the fundamental problems of normal human psychology. This was the type of investigation and instruction which James had inaugurated, but of which he wished to be relieved by one whom he thought better equipped by training and aptitude. Münsterberg stressed no special part of this broad field, but sought rather to unify it through his so-called 'action-theory.' The five volumes of the Harvard Psychological Studies which appeared between 1903 and 1922 contain mainly studies based upon the introspective reports of human subjects under experimental control, and dealing with the standard topics of sensation, perception, memory, attention, will, and feeling. The younger members of the staff have naturally developed special interests in their own research. Troland, for example, has devoted himself to physiological optics, but the work has usually been carried on by a coöperative group of students and teachers, acting for one another in the capacity of 'subjects' as well as advisers.

As early as 1902 a very different kind of investigation, in animal psychology, was inaugurated under Dr. Yerkes. A part of the Dane Hall laboratory was fitted up for the purpose, and when the Emerson Hall laboratory was planned special provision was made for it. The question of priority is here again ambiguous. It seems arbitrary in retrospect to exclude the work of biologists such as Darwin, Romanes, and Lloyd Morgan, or physiologists such as Loeb. But if consideration is to be confined to those who approached the study of animal behavior from the psychological side and set apart separate laboratory space and equipment for the purpose, then Harvard shares the credit for originality with Clark and possibly one other institution. After Professor Yerkes's resignation this work was continued by William McDougall,[1] who was called from Oxford in

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[1] Author, while he was here, of *Is America Safe for Democracy?* (1921); *Outline of Psychology* (1923); *Ethics and Some Modern World Problems* (1924); *Outline of Abnormal*

1920. McDougall further emphasized social and abnormal psychology as coördinate branches of Comparative Psychology.

In the branch of abnormal psychology Harvard was again early in the field. James approached psychology through medicine and physiology, and was interested in the French school of psychiatry from its beginning. He employed pathological material in his study of various problems of the mental life, such as emotion, will, and self, and from time to time gave courses in abnormal psychology. Münsterberg and McDougall, like James, held medical degrees, used hypnosis for therapeutic as well as experimental purposes, and both wrote and taught the subject of abnormal psychology. The Department has maintained close relations with the Department of Psychiatry in the Medical School, and with the Boston Psychopathic Hospital through its directors, Dr. Elmer E. Southard (A.B. 1897) and Dr. Charles MacFie Campbell. In 1926 a new foundation permitted the organization of a special branch of the Department in Abnormal and Dynamic Psychology, in charge first of Dr. Morton Prince (A.B. 1875) and latterly of Dr. Henry A. Murray (A.B. 1915).[1]

In view of James's well-known championship of the subject it was fitting that psychical research should also be recognized at Harvard. This was made possible through the establishment in 1912 of the Richard Hodgson Memorial Fund, under which investigations have from time to time been conducted.

In the case of applied psychology, or psychotechnology, the facts are similar. Credit for the earliest applications of psychology to education are shared by William James with James Sully of London and Stanley Hall. Experimental educational psychology was undertaken by E. L. Thorndike (A.B. 1896) at Columbia in 1899, and has been carried on systematically at Harvard under Professor Walter F. Dearborn, who since 1912 has used the Emerson Hall laboratory.[2] But for the first comprehensive view of the possible applications of psychology to industry, medicine, and jurisprudence, as well as to education, the credit belongs to Münsterberg, who began instruction and publication in this subject in 1907.

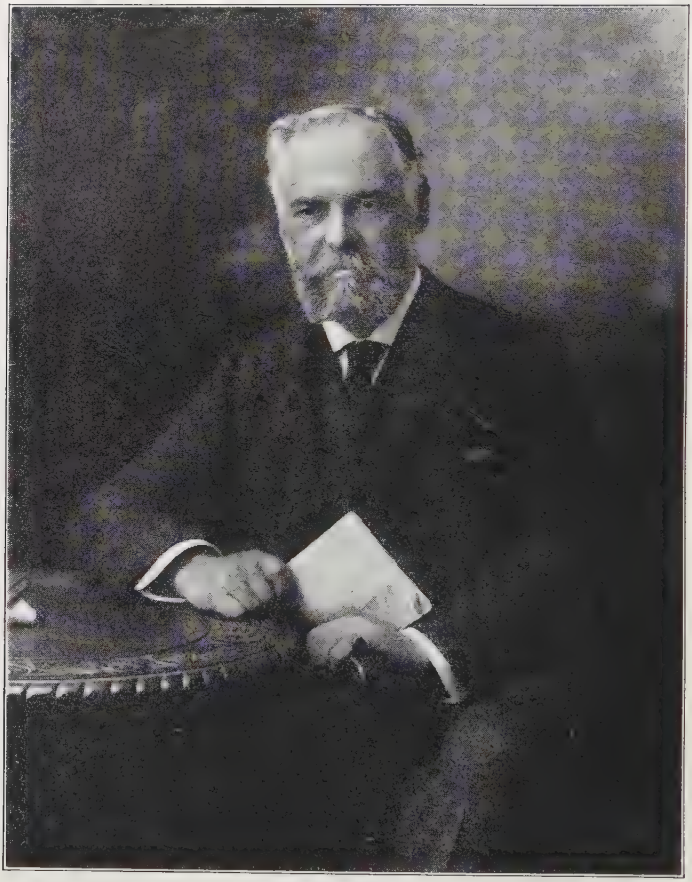
Psychology (1926); *Janus: The Conquest of War* (1927). Professor McDougall left us for Duke University in 1927.

[1] This group has established its own separate quarters on Beaver Street, where it conducts a Psychological Clinic, and provides for both instruction and research.

[2] See Dean Holmes's chapter on the Graduate School of Education, below.

The Harvard Psychological Laboratory follows those of Columbia and Chicago in the number of its graduate doctors of philosophy, who have distributed themselves widely throughout the country. The part which this Laboratory has played in the development and organization of the subject of psychology, its peculiar initiative and fertility, are of world-wide and not merely American importance, since psychology, to a degree which has no parallel, is an American science.

HUGO MÜNSTERBERG



FRANCIS GREENWOOD PEABODY

XII. SOCIAL ETHICS

1905–1929

By James Ford, Ph.D.
Associate Professor of Social Ethics

RECOGNITION that the merits of prevailing ideals of individual and collective behavior are an important subject of study came rather late in academic instruction. Some attention had been given to such problems in the Departments of Philosophy, Economics, Government, and Education; but it was not until these social sciences reached a relatively high stage of development that the need of coördinating with them instruction in social purpose and policy became apparent.

The Department of Social Ethics was established in 1906. Its name was suggested by William James. The Reverend Francis Greenwood Peabody (A.B. 1869), its founder, had first offered a course in Practical Ethics in 1881.[1] Beginning in 1883, he gave a course on Ethical Theories and Moral Reform, which dealt with problems of temperance, charity, labor, prison discipline, divorce, and so forth, and as Social Ethics 1 became the introductory course in the newly created Department of Social Ethics in 1906.[2]

Dr. Peabody was one of the first in an American university to give instruction on social problems. No other college courses devoted exclusively to these subjects during the early 'eighties have been discovered, excepting those given by Professor Graham Taylor at the University of Chicago and by Frank B. Sanborn at Cornell. Peabody's approach, however, was unique in attempting to determine the moral ends of social policy before framing measures of social amelioration. In his own words, the social question is 'the outer margin of the question of personal experience: "Set, as I inevitably am, within the social order, how shall my own life be realized, amplified, sustained, and serviceable therein?"' Attempts are made to solve the problem 'first in terms of Egoism, then in terms of Prudentialism, and finally in terms of Idealism; and in each case the [social] process is retarded and the movement remains unfulfilled, until ethical idealism expresses itself in social action and the person realizes himself in the common good.'[1] 'The system of prevailing ownership,' says Peabody elsewhere, 'is a stern test of character. It calls for conscience as well as capacity. Cupidity is often an evidence of stupidity. Ownership involves obligation. Service is the only way to freedom.'[2]

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[1] At the Divinity School, where he had given instruction in Ethics, or 'Moral Philosophy,' since 1879.

[2] Its earlier successive titles were Philosophy 11, 14, and 5, 'The Ethics of the Social Question.' From the beginning, this course had been given at the College and had been open to undergraduates. Following Peabody's resignation in 1913, it was given by Foerster and Ford; in 1920 it was divided, the first half dealing with problems of poverty, defectiveness, and criminality, and the second with problems of labor and the industrial order. In 1920 Social Ethics A, by Cabot, became the introductory course.

This latter passage refers to Peabody's close friend, Alfred Treadway White, who devoted much of his life and fortune to social service. One day in 1903 White inquired if it might not be possible for young men, while still in college, to learn how to use their time and means effectively for the public good. Peabody responded by calling attention to the possibility of developing the teaching of social ethics at Harvard University. Courses in social problems established elsewhere in departments of political science, education, economics, or sociology had often given too little attention to social philosophy, and had placed too great emphasis on matters of practical expediency.

A few days after this conversation, President Eliot received a gift of $50,000, one third of the estimated cost of Emerson Hall, upon condition that space should be assigned in it *pro rata* for instruction in Social Ethics. The second floor of Emerson Hall, accordingly, was made available for lecture, seminary, and conference rooms, a special library, and a Social Museum.[3] This gift was followed by two later gifts, each of $100,000, the purpose of which was to 'make Professor Peabody's work on the ethical dealing with the grave social and industrial evils which beset our American communities, permanent at Harvard University.'[1]

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[1] *The Approach to the Social Question*, pp. 11 and 146. Dr. Peabody's best-known work, *Jesus Christ and the Social Question* (1900), has been translated into many languages. It had a profound influence upon subsequent literature and thought on the relation of religion to social problems. His educational interests were not confined to Harvard College. He was the first president of the Association of the Prospect Union (1896), which carried on some of the earliest experiments in adult education in this country. Since 1890 he has been a member of the board of trustees of Hampton Institute, whose story he has told in *Education for Life* (1918). There is a chapter on the founder of the Institute, S. C. Armstrong, in *Reminiscences of Present-Day Saints.*

[2] *Reminiscences of Present-Day Saints*, p. 151.

[3] Described in the following publications of the Social Ethics Department: Nos. 1 and 4, *The Social Museum as an Instrument of University Teaching*, by F. G. Peabody; No. 2, *Motives and Results of the Social Settlement Movement*, by W. I. Cole; No. 5, *The Housing Problem*, by James Ford; and No. 7, *Low-Cost Cottage Construction in America*, by Winthrop A. Hamlin (1917).

In its opening year, the Social Ethics Department offered three lecture courses: the introductory one by Professor Peabody, one in 'practical problems of charities, public aid and correction,'[2] by Dr. Jeffrey R. Brackett (A.B. 1883), and Criminology and Penology, by Dr. David Camp Rogers (A.M. 1902); also a graduate seminary, a graduate research course, and the School for Social Workers, directed by Dr. Brackett.

This school, one of the first in this country to offer full-time courses in social work, was established in 1904 under the joint auspices of Harvard University and Simmons College. Its average enrolment of Harvard students during the twelve years of its connection with the University was about six. President Eliot named the school and took a personal interest in its affiliation with Harvard, where a year's work in the school counted as two full academic courses. Supplementing the courses and facilities for research, there was made possible through the Boston Associated Charities and other social agencies, public and private, an apprenticeship in practical social work. Dr. Brackett came as a recognized leader in this field[3] to the directorship of the school. Throughout its history it has been one of the leading institutions of its type.

Several of the courses in Social Ethics broke new academic ground. After Rogers was called to Kansas University in 1909,[4] Criminology was given by Dr. Ray M. McConnell (A.M. 1902), who left, at his untimely death two years later, an important manuscript on Criminal Responsibility and Social Constraint published posthumously in 1912. Between the years 1913 and 1916, Dr. C. C. Carstens, General Agent of the Massachusetts Society for the Prevention of Cruelty to Children, gave a course entitled Child-Helping Agencies. Robert F. Foerster (A.B.

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[1] Letter from President Eliot to A. T. White, dated March 24, 1903.

[2] This had first been given the previous year as Philosophy 19.

[3] He had been a director of public and private charities in Baltimore, Lecturer on Philanthropy and Social Work at Johns Hopkins, and in 1904 President of the National Conference of Social Work. By his well-known work *Supervision and Education in Charity* (1903) he did much to stimulate the establishment of professional schools for social workers.

[4] Since 1914 he has been Professor of Psychology at Smith College.

1906) and James Ford (A.B. 1905) were appointed Instructors in 1909. The former gave courses on Immigration, on Social Insurance,[1] and on Radical Social Theories; the latter, courses on the Housing Problem and on Rural Social Development, and a seminary on the Alcohol Problem.[2]

Peabody became emeritus in 1913. A letter written to him in 1917 by a social executive of national eminence who had studied under him more than twenty years before, exemplifies Peabody's influence as a pioneer teacher of social ethics.

> In my experience . . . I have met a great many people not in active social work who have come under the influence of men like yourself and have taken an entirely different point of view and interest in their respective communities. Such men become more easily interested in public affairs and more sympathetic with social movements and community problems generally. For my part I wish that every college person, in these impressionable years, could have his windows open to what, it seems to me, are after all the most real and vital things in life. . . . We have ignored feelings and rights and have failed in sympathy and sensitiveness toward the other man's point of view. Your course, and the influences and contacts it afforded, was the most valuable experience I had at Harvard, and started me in social service work.

Dr. Richard Clarke Cabot (A.B. 1889), then Professor of Clinical Medicine in the Harvard Medical School, was appointed in

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[1] In 1912 Foerster was appointed chairman of a commission on the support of dependent minor children of widowed mothers. The investigator for this commission was Ralph E. Heilman (PH.D. 1913), then instructor in Social Ethics, and since 1919 Dean of the School of Commerce, Northwestern University. A study of exceptional quality was made of existing provisions for relief of widows by public and private welfare agencies, and of current practices. The bill recommended in the report of the commission (House Document No. 2075, January, 1913) has been widely used as a model for mothers' pensions laws passed since then by Massachusetts and other states. From 1911 to 1913 Foerster was Director of the Social Research Council of Boston. In 1922 he became Professor of Economics at Princeton, and Director of the Industrial Relations Section. His *Italian Emigration of Our Times* (1919) is the standard work in its field.

[2] In 1910 Ford prepared a special report (House Document 1390) for the Board of Trustees of the Foxboro State Hospital on 'Drunkenness in Massachusetts; Conditions and Remedies.' See also House Document 2053 (1914), and 'The First Farm Colony for Drunkards,' *Survey*, October, 1910. He also made an extensive study of *Coöperation in New England*, published by the Survey Associates in 1913. In 1918–19 he was manager of a division of the United States Housing Corporation, and edited the first volume of its report (1920). Since 1924 he has been director of Better Homes in America, Inc. His *Social Problems and Social Policy* is widely used in courses on practical sociology throughout the country.

1920 Professor of Social Ethics and Chairman of the Department. Cabot had assisted Josiah Royce in the latter's seminary and throughout his career as physician had been interested in problems of philosophy. He had developed in the medical profession a deep interest in professional ethics and in social service. His book Social Service and the Art of Healing (1909) was the outgrowth of experiments in medical social service made under his direction at the Massachusetts General Hospital.[1] His introductory course on Human Relations deals with the different types of human relationship, in industry, in families, in disease and misfortune, and with the ethics of veracity, of property, freedom and restraint, sex, punishment, confidence, and suspicion. His chairmanship of the Department has led to a greater emphasis upon social theory and the theory of values, and also to greater concentration upon the problems of individual and social diagnosis and of social case work.

Between the years 1921 and 1925 Cabot conducted a seminary attended chiefly by professional social workers. In this seminary during the last two years, case records of social service agencies were analyzed with a view to discovering ethical principles which should underlie professional technique.[2] A seminary of unique value in social science was organized under his direction, in 1926, to determine what are the fundamentals which should guide the theory and the practice of the social sciences. These fundamentals were sought in the fields of philosophy, history, jurisprudence, economics, anthropology, government, and education. Many members of the Faculty attended each of these sessions, and an important outcome was the reorganization of the academic requirements for the bachelor's degree in the social sciences.

Closer correlation of Social Ethics courses with those of other divisions of the Faculty[1] had long been urged by Foerster and Ford, but had been postponed by the Great War. When Cabot took over the chairmanship, 'concentration' in Social Ethics replaced the 'field of distinction' in Philosophy and Economics. In 1920, Niles Carpenter (PH.D. 1920)[2] was appointed tutor in Social Ethics, with eleven men under his charge. By 1926 the number of concentrators had increased to fifty-seven, and the number of tutors to five. Members of the Department had long felt, however, that the field of Social Ethics was handicapped by too small a course offering and too limited access to related courses in other Departments of the University. Cabot held conferences with other department heads over a period of years, in an effort to broaden the field of undergraduate study in social problems. In 1927 a new plan for undergraduate concentration in Sociology and Social Ethics was outlined, and Professor R. B. Perry was appointed chairman of a special committee to carry the plan into effect.

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[1] His *What Men Live By* (1914) is a group of essays on the values inherent in work, love, play, and worship. His *Social Work* (1919) was a pioneer publication in social case work. In 1925 Cabot served as President of the Massachusetts Conference of Social Work, editing a volume of the addresses given at its meetings, *The Goal of Social Work* (1927). At the International Conference of Social Work in Paris, 1928, he was a chairman of the section on hospital social service work. See 'Hospital and Dispensary Social Work,' *Hospital Social Service*, xviii (1928), 269.

[2] An outgrowth of this seminary was a research made under the Milton Fund, by Sheldon and Eleanor Touroff Glueck, into the post-parole careers of former prisoners. This study, the first on the subject ever made in the history of penology, is about to be published under the title of *Five Hundred Criminal Careers*.

The general field of study comprises the Structure and Development of Society, Social History, Social Standards and Values, and Social Problems. All four of these subdivisions are included in each plan of concentration, either through course instruction or through tutorial reading. Much more systematic instruction is made possible through this device. The contributions to social theory of courses in Biology, Zoölogy (Eugenics), Anthropology, History, Philosophy, Economics, Education, and Literature, are now recognized in the study of human relations and planning of social policy. The barriers between departments have been broken down, and a broad education in the sciences which should serve as background for social theory and social service has been rendered possible.

Developments within the Department have included Cabot's courses in Personality and Character Study; Carpenter's in

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[1] Publication No. 3 of the Department of Social Ethics, *A Guide to Reading in Social Ethics and Allied Subjects* (1911), had shown the possibility and advantages of coöperative educational enterprises participated in by members of the various departments of social science in the University. The publication revealed a wide and lasting interest, on the part of the public, in the broad field which it covered.

[2] After the division of the course on Social Problems and Social Policy, Dr. Carpenter was the first to give the second part, Labor Problems, Socialism, and Social Reforms, afterwards given by Dr. William T. Ham (A.M. 1924) and now by Lincoln Fairley (A.B. 1923). In 1924 Carpenter became Professor of Sociology at the University of Buffalo. His works include *Guild Socialism* (1922) and *Immigrants and Their Children* (United States Census Bureau, 1926).

Programs of Social Reform in Relation to Christian Ethics; those of G. W. Allport (A.B. 1919) in Personality and in Social Psychology;[1] that of Sheldon Glueck (A.M. 1922)[2] in Criminology and Penology; that of Elliott D. Smith (A.B. 1913)[3] in Personnel Management; and that of P. J. W. Pigors (S.B. 1924) in Human Ideals.

In the year 1920 a new series of professional courses was offered by Ford. These are open to students in the various graduate schools of the University, and are designed to train men to become executives in public or private agencies of social welfare. The introductory course in the series (Social Ethics 25), outlines the aims and methods of social service. Its students are about equally distributed between the Graduate School of Arts and Sciences and the Theological School. It is followed by a course in Methods of Social Research by Maurice B. Hexter (A.M. 1922)[4] and one by Ford in Social Diagnosis and Case Work. Management of Institutions and Welfare Agencies is given chiefly by outside lecturers from charitable institutions, public welfare agencies, and government departments. Ford's course on Community Organization is frequently taken by students enrolled in the Graduate School of Education. That on the Housing Problem and Social Aspects of Town Planning is required for the degree of Master in Landscape Architecture in City Planning, and is often taken as an elective by students from the School of Public Health. Many graduates of these professional courses are already doing distinguished work in social service administration, and the books and articles which they have produced in recent years demonstrate the value of comprehensive training in the backgrounds of social service, as well as in the actual technique required of professional students.

In reviewing the development of the Social Ethics Department during the past twenty-three years, one is reminded of a remark by President Eliot to Dr. Brackett, which the founder of the School for Social Workers is fond of quoting: 'It is good to be in good things at their beginning.' Founded by a leader in religious thought and education, the work of the Department enlisted the support of Alfred T. White, a pioneer in the field of philanthropic housing in America. The very name Social Ethics was novel as applied to a department in a college, although it has since been widely used in titles of books, college courses, and professorships. Several of the Department's courses, notably those in Personality, in Housing, and in the Management of Institutions and Welfare Agencies, were decided innovations when first offered, but similar ones have since been given in a number of our leading universities and schools for social workers. The present chairman is known in Europe and America for having notably advanced the study of social conditions in relation to medical science. There is reason to believe that further contributions to education and to social service may be made by the Department through the plan in which it is now coöperating with others: the development of a well-defined field of concentration in the social sciences. For this plan will retain the emphasis on the ethical aspect of social problems which has characterized the Department since the earliest teachings of Francis Greenwood Peabody.

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[1] Since Allport became Assistant Professor of Psychology at Dartmouth College (1926) he has given these courses at the Harvard Summer School.

[2] Author of *Mental Disorder and the Criminal Law* (1925); assistant director of the Harvard Law School Crime Survey of Boston; appointed Assistant Professor of Criminology, Harvard Law School, 1929.

[3] Professor of Industrial Relations at Yale since 1928; author of *Psychology for Executives* (1928).

[4] Hexter has given courses in the upper group in Radical Social Theory and in Unemployment and Other Interruptions of Working-Class Income (6). He has been Executive Director of the Federated Jewish Charities of Boston and member of the secretariat of the Joint Palestine Survey Commission. His *Social Consequences of Business Cycles* (1925) was a unique contribution to social statistics.

XIII. SEMITIC

1880–1929

By David G. Lyon, S.T.D.
Hancock Professor of Hebrew and other Oriental Languages, Emeritus

1. Instruction in Semitic Languages and History

The Semites were a group of peoples inhabiting Western Asia from very early times, with marked racial traits, and speaking closely related languages. The prominent members of the group are Arabs, Aramaeans, Assyrians, Babylonians, Hebrews or Jews, Phoenicians; and in Africa, Ethiopians. Some of these peoples, as the Babylonians and Assyrians, vanished long since. The recovery of their language and their treasures of literature and art in the last century is one of the romances of modern research.

The Semites have been leaders in the march of civilization. The Babylonians inherited the learning, art, law, and organized social order of the Sumerians, and became the teachers of the Assyrians. The latter people filled their palaces with characteristic works of art, and stored in libraries the inherited learning to await the spade of the excavator twenty-five centuries later.

The Phoenicians, sea-going traders and colonizers, carried the alphabet to the West and taught the peaceful arts of trade. The Hebrews through their prophets, poets, sages, and through their genius for religion, gave to the world Monotheism and the greatest of all 'sacred books.'

Harvard College, whose founders, 'dreading to leave an illiterate Ministery to the Churches,' naturally placed great emphasis on the teaching of the 'sacred languages,' long required of all her students a knowledge of Hebrew. President Dunster was a Hebrew scholar; the third oldest chair was the Hancock Professorship of Hebrew (1764); and Hebrew orations regularly formed a part of the Commencement exercises to the nineteenth century. With the gradual secularization of the College, and the rise of schools specially devoted to ministerial education, the study of Hebrew declined. When President Eliot came into office in 1869, Hebrew, though still required for the regular programme in the Divinity School, was in the College little more than a name. The catalogue of 1868–69 places after the list of studies for Seniors this uninviting statement: 'The Hebrew Language is taught to those who desire to learn it.'

In 1869 the Rev. Edward J. Young (A.B. 1848) was appointed to the Hancock chair, but his teaching was mostly in the Divinity School. The next mention of offering Hebrew to undergraduates seems to be in the catalogue of 1872–73, where immediately after the Latin courses, we find a Hebrew elective open to Juniors and Seniors. It is offered similarly in 1873–74 with the statement that it could not be counted for honors in the Classics. From 1874 to 1881 a course of Hebrew is the first subject announced under Courses of Instruction. The Graduate Department offered lectures on the Hebrew Language and Literature once a week, in 1878–80.

In 1880, on the resignation of Dr. Young, Crawford H. Toy, who had resigned the year before from the Southern Baptist Theological Seminary, was called to become his successor. Toy continued the work of Young in the Divinity School, but set himself also to the task of developing a Semitic Department in the College. In the year 1880–81 he offered to graduates, under the heading Semitic Languages,[1] four courses (Hebrew, Biblical Aramaic, Arabic, Old Testament Isagogics and Antiquities) and a series of public Hebrew Readings. The courses offered the next year were Advanced Hebrew, Arabic, and Lectures on Old Testament Introduction and Historical Criticism, together with public Hebrew and Arabic Readings.[2] Four College Seniors enrolled in these courses, besides Divinity students.

By this time Professor Toy felt the need of a helper, and suggested the name of David G. Lyon, who had been his pupil in the Southern Baptist Theological Seminary, and was just completing the work for his doctorate at Leipzig. The Hollis Professorship of Divinity, founded in 1721, but vacant since 1840, seemed to be the only available source for his salary. Lyon was elected by the Corporation and his name referred to the Board of Overseers. Certain members of the Board considered the teaching of Semitic languages out of keeping with the terms of the Hollis foundation. It was indeed true that Thomas Hollis, the founder, had never heard of Assyriology or Semitic languages. But, as was pointed out by President Eliot, Hebrew was a subject long taught by the Hollis Professor, Assyrian was a closely related tongue, Assyriology was germane to Biblical study, and, under existing conditions, so different from those of 1721, all the terms of the Hollis requirement could not possibly be carried out. After prolonged discussion the election was confirmed, in 1882.

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[1] Semitic Languages continued to be the title of this new Department until 1889, when it was enlarged to Semitic Languages and History, a name which has continued ever since.

[2] These evening readings were an institution of the period. In 1881–82, G. H. Palmer and several members of the Classics Department gave thirty-four evenings on Homer, Sophocles, Aeschylus, Aristophanes, Plato, Theocritus, Terence, Livy, Catullus, and other classical authors. Child and others gave readings from Chaucer and other English poets.

In the catalogue for 1882–83 appear eight Semitic courses, including those offered by Lyon: Elementary and Advanced Hebrew, Arabic, Aramaic, Assyrian, Assyrian Antiquities, Lectures on the Criticism of the Pentateuch, the Quotations from the Old Testament in the New Testament.

With slight changes in description the same list appears also in the Divinity School announcement. The recognition of Semitic languages as suitable for the B.D. degree, and of Old Testament subjects as suitable for an academic degree, illustrates a practice which was later applied to many other departments. By degrees practically any College course might be substituted for a Divinity course, and *vice versa*, with the restriction that only a limited number of such exchanges might be made by any one student.

The eight courses of 1882–83 had grown to seventeen in 1890–91, by the addition of Ethiopic, Phoenician, General Semitic Grammar, Babylonian-Assyrian History, Political and Social History of Israel, Hebrew Religion, Pre-Christian Hebrew Literature, Political and Literary History of the Bagdad Califate and of the Spanish Califate.

Two important groups of courses have been added in later years, one dealing with Islam and the political and social history of the Mohammedans; the other dealing with Jewish life and learning. The latter group began in 1915 with the appointment of Harry A. Wolfson (A.B. 1912) as Instructor. It was made permanent in 1926 by the Hon. Lucius N. Littauer (A.B. 1878), who established in memory of his father the Nathan Littauer Professorship of Jewish Literature and Philosophy, Dr. Wolfson becoming the first incumbent.[1]

Prior to the Littauer foundation the Hancock was the only endowed chair in Semitic at Harvard.[2] Present indications are that Arabic will soon be added to the list. Then the only other major branch unendowed will be Assyriology.

Further additions and changes in the staff of teachers followed. In 1902 Dr. George Foot Moore was called to Harvard as Professor of Theology. Two years later he became first Frothingham Professor of the History of Religions. There was intimate connection between certain courses of his and some of those given by Toy. George A. Reisner (A.B. 1889) was Instructor in Semitic Languages, 1896–97. He became Assistant Professor of Semitic Archaeology in 1905; but owing to absence from the country in connection with explorations in Palestine and Egypt, he gave no courses in the Department. In 1910 he became Assistant Professor of Egyptology.[3]

Toy resigned in 1909. In honor of his seventy-fifth birthday a volume of essays was published, bearing the title Studies in the History of Religions, Presented to Crawford Howell Toy by Pupils, Colleagues, and Friends. The history of religions had long been one of Toy's special interests, and he had founded at Harvard a club devoted to its study. On Toy's resignation Lyon was transferred to the Hancock Professorship, and James H. Ropes (A.B. 1889) of the New Testament Department of the Theological School became the sixth Hollis Professor.

Dr. James R. Jewett (A.B. 1884) began his Semitic studies as an undergraduate and continued them for several years in Germany and Syria. After one year as Instructor in Semitic at Harvard (1887–88), and after taking his doctor's degree at Strasbourg, he became successively Professor of Semitic and Arabic at Brown, Minnesota, and Chicago, whence he was

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[1] Mr. Littauer has also founded a research fellowship in Semitic. Thirteen undergraduates and one graduate student took the Literature course of Professor Wolfson in 1926–27; there were twelve undergraduates enrolled in the Elementary Hebrew course; and the total enrolment in the other courses of the Department, exclusive of theological students, was twenty.

[2] The endowment of the Hancock chair, which yielded only $309.41 in 1891 ($1353.83 when combined with the Dexter Lectureship), was in that year increased by $71,000 through the bequest of Charles L. Hancock (A.B. 1829), a collateral descendant of the founder. Since that time the endowment has been further increased so that it now yields over $9000 annually.

[3] See Dr. Reisner's chapter on Egyptology, below.

CRAWFORD H. TOY

GEORGE FOOT MOORE

called in 1911 to become Professor of Arabic at Harvard. The affiliation of the Andover Theological Seminary with Harvard in 1908 gave to the Semitic Department another teacher, William R. Arnold (PH.D. Columbia, 1896), Professor of the Hebrew Language and Literature. On Lyon's retirement in 1922 Arnold succeeded him as Hancock Professor. One other teacher of professorial rank, Dr. Maximilian L. Kellner (A.B. 1885), Professor of the Literature and Interpretation of the Old Testament in the Episcopal Theological School, has assisted in the instruction.

Other Assistants and Instructors who have been connected with the Semitic Department one year or more are now named in the order of the year of their first appointment:

Dr. Frank D. Chester (A.B. 1891)	1892
Dr. Macy M. Skinner (A.B. 1894)	1894
Dr. Henry H. Haynes (A.B. 1873)	1900
Dr. William R. P. Davey (S.T.B. 1905)	1907
Martin Sprengling (A.B. Northwestern 1894)	1912
William W. Eddy (A.M. 1914)	1915
Dr. William Thomson (A.M. Glasgow 1907)	1915
Garabed M. Missirian (S.T.B. 1914)	1916
Dr. Robert H. Pfeiffer (A.M. 1920)	1921

In 1929 Dr. Thomson was appointed Associate Professor in Arabic, and Dr. Pfeiffer, Lecturer in Assyriology. The last named is also Associate Professor of Biblical and Cognate Languages in the Theological School of Boston University.

From the beginning of the Semitic Department in 1880 its teachers have been animated by several leading motives:

1. To enable students intending to become ministers to complete in college the Hebrew requirement for the B.D. degree, and thus gain more time later for subjects of strictly theological character.
2. To introduce college students to modern methods in the study of the Bible, the greatest of religious books, and also, even in an English dress, one of the chief masterpieces of literature.
3. To bring to the attention of students for the purpose of general culture the history and the literary treasures of the Semites.
4. To meet the needs of students of comparative literature.
5. To train teachers and investigators in this branch of

knowledge, that they may hand on the torch of Semitic learning to their successors.

The first of these motives is less impelling now than it was half a century ago. A change has taken place in regard to the requirement of Hebrew, which has been made elective in many, if not most, of the theological schools. This change has had the effect of greatly diminishing the number of students taking Hebrew, and, in consequence, the number of those who study any other Semitic language.

Furthermore, the number of Semitic scholars has grown more rapidly than the number of teaching positions, and not a few of them have been obliged to turn to other subjects, or to enter on other forms of activity. In spite of its high value and interest, students now specializing in this field need to have some independent means, much patience, and a Spartan courage.

This may sound like a note of pessimism, but no harm can result from recognizing actual conditions. An encouraging sign of the times is the new Harvard Fellowship for Research in Semitic. May the number grow!

2. The Semitic Museum and Exploration

The Semitic Museum had its origin in the effort of Professors Toy and Lyon to secure the means to engage in Babylonian-Assyrian exploration. At the end of 1887 Lyon discussed the matter with President Eliot, who expressed his approval. The first results were contributions by Miss Ellen F. Mason of Boston and Hon. Stephen Salisbury (A.B. 1856) of Worcester for the purchase of two small collections of Babylonian tablets.

By January, 1889, the movement had assumed the form of an effort to obtain funds for a Semitic Museum. In the same month Lyon made the acquaintance of Jacob H. Schiff of New York, well known for his gifts to philanthropy and education and for the unobtrusive manner of his benefactions. In November a committee, consisting of Professor Andrew P. Peabody, Mr. Schiff, and Mr. Salisbury, was appointed by the Board of Overseers to visit the Semitic Department.[1]

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[1] On the death of Dr. Peabody in 1893 Mr. Schiff was chosen chairman, and held the office until his resignation from the Committee in 1914. He was succeeded by President Emeritus Eliot, who had been elected a member of the Board of Overseers. After his term as chairman expired, Dr. Eliot again served twice on the Committee, and was a member at the time of his death.

At the first meeting of the Committee in December, 1889, Mr. Schiff offered five thousand dollars for the purchase of material to illustrate the instruction given by the professors of Semitic, and doubled the amount of his gift a week later.

Lyon was sent abroad in the summer of 1890 in search of such originals as could be found in the hands of dealers in antiques and such reproductions as the museums offered for sale. On this trip he had the pleasure of meeting Sir Henry Rawlinson, decipherer of the cuneiform inscriptions. In January, 1891, Lyon was elected Curator of the new museum, and served as such until 1922. Since then he has continued in service with the title of Honorary Curator.[1]

The Trustees of the Peabody Museum generously offered a gallery in their building as a temporary home for the Semitic collections which had been acquired. Here they remained till they were transferred to their permanent home. The Semitic Museum was erected by Mr. Schiff at a cost of some eighty thousand dollars. At the same time other friends gave about twenty thousand more for additions to the collections.

The Museum was opened with appropriate ceremonies on February 5, 1903. It contains two large exhibition rooms, three lecture rooms, a room for the library, one for the Curator, and a storeroom. It is open to the public every day in the year except Christmas and the Fourth of July. The objects on exhibition are well provided with descriptions, on the principle that a proper museum consists of plenty of good labels illustrated by specimens.

The library was begun by a contribution some years earlier from Mr. Schiff, and was enlarged by other contributions from him later. The total amount of his gifts to the Semitic work at Harvard was not far from $275,000, including the building and much of the material which it contains, $50,000 of endowment for teachers' salaries, $50,000 for exploration and publication with subsequent additions, books for the library, provision for publishing several volumes of the Harvard Semitic Series, and a bequest of $25,000, the income to be used in buying specimens for the Museum. This great work of Mr. Schiff was generously seconded by many other friends of the University.

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[1] In conferring an honorary S.T.D. on Professor Lyon at Commencement, 1901, President Eliot described him as an 'Assyrian scholar, who conceived of the Harvard Semitic Museum, and is seeing his vision fulfilled.' — *Harvard Graduates' Magazine*, x, 72; cf. pp. 169–170. S. E. M.

The offer of $50,000 for exploration was made by Mr. Schiff in 1905, but owing to delay of the Turkish Government in granting permission to dig, work could not begin before the spring of 1908. The site chosen was the hill on which once stood Samaria, the chief capital of the Kingdom of Israel, built by Ahab's father, Omri, about 880 B.C. Samaria was several times destroyed and rebuilt. The most magnificent restoration was carried out by Herod the Great shortly before the beginning of our era.

Owing to unfavorable local conditions the work in 1908 was greatly hindered, but enough was done to prove that the site was important. The Director, Dr. Gottlieb Schumacher, wishing to be relieved at the end of the season, the campaigns of 1909 and 1910 were conducted by Dr. George A. Reisner, as originally planned.

The scientific results of the work at Samaria were highly important, especially in regard to the history of the site, and in regard to Hebrew architecture and epigraphy. Many remains of the temple to Jupiter, erected by Herod and restored by Roman emperors, as well as considerable portions of the palace of Omri, enlarged by Ahab, were uncovered. Many ostraca also were found, the writing on which was among the earliest known specimens of Hebrew. All the movable finds went to the Imperial Museum at Constantinople, by the strict application of the Turkish law relating to antiquities.

The work at Samaria is fully described and illustrated in two important volumes of the Harvard Semitic Series issued in 1924, with the title Harvard Excavations at Samaria, 1908–1910. Through the generosity of members of Mr. Schiff's family, who made up the deficiency in the cost of publication, about half the edition was distributed gratis among the leading universities, libraries, and museums of the world.

A second expedition was sent out in 1927, this time to the site of ancient Nuzi in Iraq. The city was destroyed about 1500 B.C. and never rebuilt. The ruins are about two hundred miles north of Bagdad and some ten miles from the city Kirkuk. The expedition, supported by the friends of three institutions (the Semitic Museum, the Fogg Museum of Art, and the American School of Oriental Research at Bagdad), was led by Professor Edward Chiera of Chicago University.

The finds were divided between the National Museum at Bagdad and the two museums at Harvard. Of the Harvard portion the art material went to the Fogg Museum, the archaeological and inscriptional to the Semitic Museum. Besides great masses of pottery and numerous implements in bronze, several objects of extraordinary interest were found. Of these a bronze censer and some large fragments of frescoes are now in the Fogg Museum. The Semitic Museum received the cuneiform tablets, the writing on which is in the Babylonian language; but the population of Nuzi seems not to be Semitic. There are indications of connection with the Hittite stock.

With the kind assistance of friends the work at Nuzi goes on this year (1928–29), with Dr. Robert H. Pfeiffer of the Department as Director. Reports from the field, illustrated by photographs and drawings, have been satisfactory, and the Museums hope it may be possible to continue.

A volume of inscriptions selected and copied by Professor Chiera from the tablets discovered in 1927–28 has been published in the Harvard Semitic Series; and the Nuzi material in the Museum makes other volumes possible. In this publication, as in the volume on Harvard Excavations at Samaria, in Dr. Mary I. Hussey's Sumerian Tablets in the Harvard Semitic Museum, and in a volume soon to be issued by Professor Wolfson, the Museum is fulfilling two of the objects for which it was founded: exploration and publication. It is likewise fulfilling a third object, that of illustrating and illuminating the instruction given in the Department. To students in other branches of study also, and in other institutions, especially students of the Bible, history, and art, as well as to the general public, it is a storehouse of information. Many public illustrated lectures, single and in series, on the contents of the collections, explorations in Semitic lands, or on the Bible, have from time to time been given in the Museum.

With perfect propriety the Museum might have been named Biblical Museum, as one friend proposed, because of the intimate relations between the Hebrews, by whom the Bible was written, and the other members of the Semitic family. Many a Biblical passage, such as those referring to Ur, Babylon, Nineveh, or to the great rulers, like Sargon, Sennacherib, Nebuchadnezzar, take on deeper meaning when one stands before sculptures coming from these cities and inscriptions written by order of these monarchs. Under intelligent guidance these venerable memorials of the past quicken and enrich the mind and heighten the feeling of the worth of history.

This paper has mentioned the names of two benefactors who have greatly befriended the Semitic Department and the Museum. Two others, who for special reasons prefer not to be mentioned, have likewise 'done great things for us, whereof we are glad.' They have for years been liberal supporters of the instruction given in the Department, have made generous contributions towards the work of exploring Nuzi, and have provided a fund for fellowships and for publication, not indeed immediately available, but amounting ultimately to $125,000.

Viewing the instruction and the Museum as a whole, in the light of present conditions, the most hopeful path of progress seems to lie in the direction of exploration and publication. To follow this pathway involves several things: the establishment of a chair of Assyriology, now the great desideratum of the Department; the adequate endowment of the Museum, to provide for care, maintenance, and the purchase of material for study and exhibition; the outlay of large sums for exploration in Iraq, Palestine, Syria, and Asia Minor. With anything less, Harvard cannot keep step with other American universities in a branch of learning which she established almost three centuries ago.

XIV. EGYPTOLOGY

1896–1928

By George Andrew Reisner, Ph.D.
Professor of Egyptology

PROFESSOR David Gordon Lyon was chiefly responsible for founding the Department of Egyptology at Harvard, and for the connection of the Egyptian Expedition with the University. The first course on the Egyptian language and hieroglyphics was given by myself in 1896–97, when an Instructor in Semitic Languages.[1] The principal student in the course was Mr. Albert Morton Lythgoe (A.B. 1892).

This early attempt to found a department of Egyptology came to an end in 1897 when I became a member of the International Catalogue Commission of the Khedivial Museum in Cairo. I resigned from this commission in 1899 to organize the Egyptian Expedition of the University of California, 1899–1905, supported entirely by Mrs. Phoebe Apperson Hearst. Mr. Lythgoe was my chief assistant from 1899 to 1904, when he was appointed Instructor in Egyptology at Harvard. In 1904–05 he gave two courses, one on Egyptian Art and the other on Egyptian Archaeology.

In the summer of 1905 President Eliot formed a general plan for the future of the Egyptian and Semitic Departments, by which Mr. Lythgoe was appointed Assistant Professor of Egyptology, and I, Assistant Professor of Semitic Archaeology. With Mrs. Hearst's approval, her expedition was taken over as a working organization. It was named the Joint Egyptian Expedition of Harvard University and the Boston Museum of Fine Arts, a title since shortened to the Harvard-Boston Expedition. Gardiner Martin Lane (A.B. 1881), then president of the Board of Trustees of the Museum of Fine Arts, obtained by subscription the money for the expedition, and remained its chief support until his death in 1914. I was appointed Director and Professor Lythgoe Field Director of the Egyptian Expedition. He resigned in the spring of 1906 to take a position with the Metropolitan Museum of New York.

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[1] Professor Reisner (A.B. 1889, PH.D. 1893) from 1893 to 1896 held a travelling fellowship for research in cuneiform, and at that time studied Egyptian under Professor Sethe at Berlin. His publications include *Tempelurkunden aus Telloh* (1901); *The Early Dynastic Cemeteries of Naga-ed-Dêr*, Part I (1908); *Models of Ships and Boats* (1913); *Excavations at Kerma* (2 vols., 1923). S. E. M.

In 1905–06, the expedition continued clearing the great western cemetery at Giza, excavating the mastaba tombs of Cem. G 2000, under the immediate supervision of Professor Lythgoe. The next year, with Mr. C. M. Firth of Oxford as chief assistant, the expedition turned to the area of the Third Pyramid (Mycerinus) and excavated the pyramid temple and its surroundings. In 1907, with the approval of the University and the Museum, the whole organization was loaned to the Survey Department of the Egyptian Government (Director General, Sir Harry Lyons) for the Nubian Archaeological Survey, on which it was engaged from 1907 to 1909.[1]

In the summer of 1908, the workmen, not being needed in Nubia, were employed under the direction of Oric Bates (A.B. 1905) to begin the excavation of the Valley Temple of the Third Pyramid (Mycerinus). In this campaign, seven masterpieces of Egyptian sculptures were discovered and became the decisive factor in the continuation of the Harvard-Boston Expedition. In the summer of 1909 and 1910, I was engaged in excavations in Samaria.[2] In the winter of 1909–10, working as the Harvard-Boston Expedition, we continued the excavation of the Valley Temple of Mycerinus, and discovered the famous slate statue of Mycerinus and his queen now in the Boston Museum of Fine Arts. In the latter part of that winter, Mr. Clarence S. Fisher of Philadelphia went up with me to the scene of our former work at Naga-'d-Dêr, where we cleared and recorded a large part of the predynastic cemetery of Mesa'eed. This was in accordance with the general policy of obtaining archaeological material from all periods of Egyptian history, a policy which was also calculated to obtain a complete series of objects for the Museum of Fine Arts. The main purpose of the expedition has always been historical research. The objects found, although necessary for the continuation of subscriptions, have always been regarded by the expedition as a by-product of historical research.

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[1] This survey was continued by Mr. Firth with part of the organization from 1909 to 1911.

[2] See Professor Lyon's chapter on Semitic, above.

In 1910 I was transferred from the Semitic Department, and as Assistant Professor began the present Department of Egyptology. In 1910–11, the expedition, under Fisher, carried out excavations at the pyramid and cemeteries of Zawiet-el-Aryan (Dyn. I–III and XVIII). In January, 1911, I returned to Cambridge and listed the six courses which have been offered ever since as often as the expedition work permitted: the Egyptian Language (for beginners); an advanced course in the language; the History of Egypt; the History of Egyptian Art; Egyptian Archaeology; and Theory and Practice of Archaeological Fieldwork as a Branch of Historical Research. With these courses, instruction was finally offered in the whole field of Egyptology. President Lowell laid down the principle that instruction should be given at the University once in every three or four years. These years have been 1910–11 (second half), 1911–12 (first half), 1921–22 (first half), and 1924–25 (second half).

During 1911, Mr. Lane succeeded in providing adequate support for the Egyptian Expedition by organizing a group of sustaining subscribers, mostly Bostonians and Harvard graduates, but including also Mr. Henry C. Frick. With the support this assured, work was resumed on January 1, 1912, at Giza Pyramids (Cem. G 2000) and carried on for the rest of the season 1911–12 with Fisher and Mr. L. Earle Rowe of Providence as my associates. As an auxiliary to the Giza excavations the expedition made another short campaign at Naga-'d-Dêr and excavated the cliff cemeteries of Mesheikh (Predynastic, Dyn. V–VIII, and late New Kingdom).

In 1912--13, during the first half of the season, the excavations at Giza were continued in Cem. G 2000 and in the Mycerinus Quarry, with Fisher and Louis Coulton West (A.M. 1912) assisting. In the second half of the season, I sent West to make minor excavations at Naga-el-Hai, Sheikh Farag, and Mesa'eed. I myself proceeded to the Sudan to carry out in Dongola Province the reconnaissance which led to the greatest adventure in the history of the expedition: the recovery of the lost history of Ethiopia. The reconnaissance terminated abruptly at Kerma, an ancient site at the head of the Third Cataract. I discovered there the remains of an Egyptian trading post of Dyn. V–VI, together with the fortified administrative center and the cemetery of an Egyptian colony of Dyn. XII. The preliminary work lasted only six weeks, but committed the expedition to the complete excavation of the site. We carried out further campaigns in 1913–14 (West), 1914–15 (Fisher), and 1915–16 (Walter Kemp).

While the work went on at Kerma, the Giza excavations were continued during 1913–14, 1914–15, and 1915–16 by a series of short campaigns in Cem. G 4000 which yielded eight life-size portrait heads of princes and princesses of the royal family of Dyn. IV. I was arranging to return to the University in 1914–15 when the Great War broke out and detained me in Egypt until 1921.

Dr. F. L. Griffith, Reader in Egyptology at Oxford, invited me in 1915 to take over the permit for excavations at Gebel Barkal (Napata), the most important site in the Sudan; and the Sudan Government very graciously confirmed the transfer. With the assumption of this concession, the exploration of Ethiopia entered on a new phase. In 1915–16, the main part of the expedition, with Dows Dunham (A.B. 1913) as assistant, began the excavation of the temples of Amon-Ra at Gebel Barkal (Napata) and the two groups of pyramids on the adjacent desert. The temples proved to have been built by the kings of the first independent kingdom of Ethiopia, but the largest of all had been begun by Egyptian kings of the New Kingdom. Here we discovered eleven large granite statues of Tirhaqa and his immediate successors. The pyramids were of the Meroitic Dynasty of Napata, but the chief importance of their excavation lay in the fact that we discovered for the first time the position of the burial chambers. This discovery enabled the expedition to work out the burial chambers of all other Ethiopian pyramids with the greatest ease. The campaign of 1915–16 ended with the identification of the pyramids of Nuri (suburbs of Napata) as the tombs of the kings of the first monarchy of Napata.

During the next two years, the expedition excavated the pyramid field of Nuri; twenty pyramids of kings of Ethiopia (including Tirhaqa) and seventy-five pyramids of their queens. In 1918–19, the tombs of the remaining kings, Piankhy, Shabaka, Shabataka, and Tanutamon, who ruled Egypt (Dyn. XXV) as well as Ethiopia, were identified in the royal cemetery of El-Kur'uw (on the 'north' side of Napata), together with the pyramids of their ancestors (including King Kashta) and their queens. The excavation of the six temples of the gods of Gebel

Barkal (Napata) was continued by Kemp and Dunham during this and the subsequent year, and a number of important historical inscriptions were discovered.

Independent Ethiopia had passed through two periods: the earlier kingdom of Napata, and the later kingdom of Meroë. Having, by 1920, recovered as completely as possible the evidence on the kingdom of Napata, the Harvard-Boston Expedition obtained a concession for the pyramids of Meroë, and transferred its work southwards to Begarawiyah, the village nearest to Meroë, between the Fourth and Fifth Cataracts. The attention of the expedition during the next three years (1920–23) was concentrated on the three fields of pyramids at that site; Ashton Sanborn (A.B. 1905), Mr. H. L. Story, and Mr. and Mrs. Dunham being in charge. Here the chronological outline of the history recovered at Napata was extended to cover the Meroitic Kingdom.

This series of campaigns at Napata and Meroë yielded up not only a chronological outline of the independent monarchy of Ethiopia during eleven centuries (750 B.C. to 350 A.D.), but also a fairly full view of its cultural development. The 'finds' included twelve statues of the kings, four important historical inscriptions, a large number of reliefs, and a wonderful collection of the funerary furniture of the royal tombs (gold, silver, faience, alabaster, and so forth). With the work of 1922–23 the royal sites were finished, but a number of others remained of manifest importance. Among these were the twelve Egyptian forts which guarded the passage of the fifty miles of cataract just above Wady Halfa (Second Cataract). Accordingly in 1923–24 Mr. and Mrs. Alan Rowe began the excavation of the two forts at Semna for the Expedition.

In August, 1921, while the exploration of the pyramids at Meroe was still in hand, I returned for the first time since 1912 to America, and gave several Egyptology courses at Harvard. At the end of the Semna campaign of 1923–24, it was decided that I should return again to the University. It was therefore arranged to concentrate the work of 1924–25 at the Giza Pyramids, and to open the excavation of the royal cemetery of Cheops east of his pyramid, beginning on November 1, 1924. The importance of this cemetery was proved immediately by the identification of the tombs of Prince Kawa'ab, eldest son of Cheops, four other princes, and the Princess Meresankh II, as well as the tombs of the pyramid priests, Qu'ar and Iduw. In January, 1925, I returned to give Egyptology courses, leaving Alan Rowe in charge of the work. In March he cabled me the news of the discovery of an intact royal tomb, afterwards identified as the secret tomb of Queen Hetep-heres I, the mother of Cheops. This discovery of the only intact royal tomb of the Pyramid age was of such paramount importance that it held the attention of the expedition during the next two years, and forced me to concentrate on the Giza excavations. The burial chamber of Hetep-heres contained among other things a mass of gold-cased household furniture such as had never been seen before. The record of this tomb was the finest and most detailed which the expedition had ever made, and took my entire time with that of an assistant from August 1925 until March 1927. Meanwhile the excavation of the cemetery continued with Lieut. Comm. Noel Wheeler in direct charge, and in April, 1927, resulted in the discovery of the tomb of Meresankh III, a granddaughter of Cheops, which gave us the final clues to the history of the family of Cheops. The excavation of the cemetery east of the Cheops Pyramid was continued in 1927–28 and 1928–29. The restoration of the furniture from the tomb of Hetep-heres was begun by Dunham in 1926–27, and has been continued by Mr. W. A. Stewart during 1927–28 and 1928–29.

In 1927, the expedition resumed the work earlier begun at Semna. Wheeler was in charge. He finished the two forts at Semna by 1929, and has begun the excavation of the third fort, at Uronarti.

The Egyptian Expedition has now worked for thirty years in the field in Egypt, Palestine, and the Sudan; Augustus Hemenway (A.B. 1875), has succeeded Gardiner Martin Lane as chief supporter of the expedition and as Chairman of the Egyptian Committee. Thirty-four other persons have given various amounts; and the trustees of the Boston Museum of Fine Arts have made considerable contributions to the annual requirements of the expedition. All the objects assigned to the expedition by the Egyptian and the Sudan Government have gone to enrich the collections of the Boston Museum of Fine Arts, and have made the Egyptian Collection in that museum one of the most distinguished in the world. Harvard University has the right to publish the work of the expedition. Both the Egyptian and the Sudan Governments have given the expedition every assistance in its research, and have been very fair in their division of the objects discovered.

The outstanding features of the Harvard-Boston Egyptian Expedition have been:

Development and improvement of methods of excavation and recording, with the idea of making archaeological field-work a scientific method of historical research.

The creation of a working organization carrying out as a matter of habit the principles laid down for efficient work.

Historical results concerning the provincial culture of Egypt, from the Predynastic Period; the history of the royal family of Dyn. IV and the development of the arts and crafts during the Pyramid age; the history of Lower Nubia, from the Predynastic Period; the history of Samaria from Omri to the Byzantine Period; the history of Ethiopia from about 4000 B.C. to 350 A.D.

Since 1905, 'Harvard Camp' at the Giza Pyramids has been the base of all operations and the storehouse of all the records of the expedition. Here also the results are studied and the publications written.

XV. MATHEMATICS

1870–1928

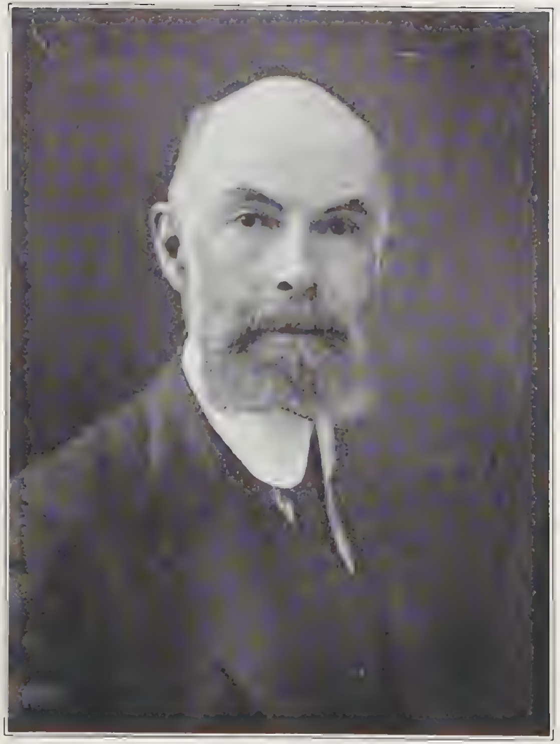
By Julian Lowell Coolidge, Ph.D.
Professor of Mathematics

THE subject of mathematics has always been highly considered at Harvard. The first professorship of a profane topic, the Hollis Professorship of Mathematics and Natural Philosophy, was founded in 1727. It is true that the choice of the first incumbent was not altogether a happy one, for if Isaac Greenwood (A.B. 1721) had the merit of orthodoxy, he had the failing of being a confirmed drunkard. The second professor, John Winthrop (A.B. 1732), appointed in 1738, more than restored the balance. He was Fellow of the Royal Society, and the founder of American astronomy. During the years 1831–80 the strange figure of Benjamin Peirce (A.B. 1829) completely dominated the situation. His great natural mathematical talent and originality of thought, combined with a total inability to put anything clearly, produced upon his contemporaries a feeling of awe that amounted almost to dread. But his lasting effect on American mathematics was not commensurate with his natural genius, and the same was perhaps true of J. J. Sylvester, professor at Johns Hopkins, and founder of the American Journal of Mathematics.

The true rebirth of mathematics in the United States occurred during the last decade of the nineteenth century. A number of young Americans of ability and character returned from fruitful sojourn in Germany. Some had come under the extraordinary influence of Felix Klein in Göttingen; all were inspired by enthusiasm for their science, and a determination to foster it in their own country. They organized advanced mathematical instruction in their various universities as it had never been organized before, published original mathematical results of high value, and, above all, founded the American Mathematical Society. This organization, by drawing together the combined mathematical ability of the country, and publishing two of the best mathematical journals in the world, succeeded in the course

MAXIME BÔCHER

BENJAMIN PEIRCE



WILLIAM F. OSGOOD

of a generation in raising the United States from a modest place to a position of first importance in the mathematical world.

At this juncture the Fates were very good to Harvard, for two of the ablest and most devoted men of this group joined the teaching staff in Cambridge. They were William Fogg Osgood (A.B. 1886) and Maxime Bôcher (A.B. 1888). Thus the expansion of mathematics in the University, was a part of the general mathematical renaissance throughout the country, to the advantage of both. In the period of thirty years Harvard furnished three of the biennially elected presidents of the Mathematical Society, and two of the subsequently formed Mathematical Association of America, to say nothing of many vice-presidents of these two organizations, and some dozen editors of leading mathematical journals. During the years 1899–1912 Harvard took over from the University of Virginia the responsibility for publishing a thoroughly sound journal, the Annals of Mathematics. At the end of that period, the Governing Boards, for reasons of economy, withdrew the subsidy necessary for its support; the responsibility passed to Princeton, where both the ability and the funds were available.

It must not be imagined that the appointment of Osgood and Bôcher produced any immediate or revolutionary changes in the mathematical conditions at Cambridge. Fortunately such changes were not needful. Perhaps the Harvard of that time was more eminent in humanistic studies and in philosophy than in science, but her scientific position was by no means contemptible. The great museum bore the name of the elder Agassiz, and was ably managed by the younger. Botany brought to mind the names of Goodale and Farlow; psychology, James and Münsterberg. In chemistry a great figure was passing in Cooke; in geology the astounding Shaler had a wide influence. In mathematics three men had borne the heat and burden of the day since the death of Benjamin Peirce, namely, his son, James Mills Peirce (A.B. 1853), William Elwood Byerly (A.B. 1871), and Benjamin Osgood Peirce (A.B. 1876), a distant relative of the other Peirces.

James Mills Peirce, affectionately known as 'Jimmie,' whose love of good cheer survived an early apprenticeship to the Unitarian ministry, performed for many years a rather ungrateful rôle. Understudy to his father, while lacking the latter's brilliance, he had the task of providing Harvard with a teacher of mathematics who was interested in teaching. He was not a productive scholar, but appreciated scholarship, and he deserves to be kept forever in grateful remembrance for his work in fostering the Graduate School during its early years. In teaching he inherited from his father an unduly high opinion of the importance of the calculus of quaternions, but he performed an important service in fostering an interest in the theory of functions of a complex variable, a subject which subsequently became the very backbone of the instruction in higher mathematics.

Byerly received the first degree of Doctor of Philosophy ever awarded by the University. He had a great natural love for teaching, and was for many years a most successful teacher. He implanted a real love for mathematics in many pupils, he published the best and most vital American texts of his time dealing with the differential and integral calculus, and he established the valuable tradition of basing elementary instruction on concrete problems of suitable difficulty which the class worked out in large numbers, and which were promptly returned with corrections. Perhaps his teaching would have been even finer if he had maintained a greater interest in productive scholarship, and closer sympathy with producing scholars. It was said in praise of him: 'Others taught the subject, he taught the class.' There is an element of danger in a didactic method which receives such a eulogy. The basis of good teaching is love. The true teacher will love both the subject and the class, and will teach both.

Benjamin Osgood Peirce, who for many years collaborated closely with Byerly, was more nearly connected with physics than with pure mathematics, and most of his published papers are in the physical field. But he was entirely sympathetic to mathematics also; his Short Table of Integrals was a most useful handbook for countless mathematical workers, and he maintained useful contacts with British and Continental mathematicians. He had a faith in his students which inspired them to do their best, and a faith in the virtue of solving problems which surpassed even that of Byerly. He introduced the so-called 'long paper,' an examination which the student took at home and at leisure, to supplement the regular mid-year or final examination; and it is on record that on one such test he put down fifty numbered problems which really amounted to one hundred and thirty-three separate questions.

Let us return to Osgood and Bôcher, and inquire what were the effects of their addition to the Division of Mathematics. To begin with, two teachers were added of equal but opposite excellence. Osgood acquired skill in teaching by the same process that brought him scientific eminence: conscientious effort and high ideals. He found out by experiment what were the most important things to teach, and what was the best way to teach them. Nothing was left to chance or the inspiration of the moment. When he finished there were no loose ends. Bôcher never made an appreciable effort to be clear or interesting. His teaching *was* clear, because his mental processes were like crystal; his teaching *was* interesting because he cared about interesting things. Yet the principal contribution of these two men was to establish traditions and standards as a guide to the future. These came through gradual growth in a period of twenty-five years. To take a concrete instance, there was the degree of Doctor of Philosophy. This was established in 1873, Byerly being the first recipient as noted above. But in the earlier decades the ablest students were advised to take their advanced degrees abroad, and Harvard was willing to accept such studies as 'The Investigation of the Constants of the Merz Equatorial' as contributions to mathematical science. After 1910 the Harvard doctorate was esteemed good enough for any student, no matter what his ability, even though he might subsequently be advised to spend some time in European study.

Of even greater importance than the improvement and extension of the doctorate was the shaping of a body of ideals for the teaching staff. It came to be recognized that no man should be considered for permanent appointment, and no man appointed should be considered for promotion, unless he showed proof of enduring ability and desire to contribute to the advancement of mathematical science. Such a stipulation sounds axiomatic in the twentieth century; it was nothing of the sort in the nineteenth. Charles Joyce White (A.B. 1859) was appointed a member of the Department by presidential fiat in 1870, though his mathematical knowledge never went beyond the point which a man specially interested in classics needed to reach in order to get a Harvard A.B.; and any natural aptitude he may have had for teaching was successfully extinguished by service as instructor at the Naval Academy. Such appointments ceased in the new era, and the new generation of teachers took all their responsibilities seriously.

This is not the place to detail the scientific contributions of the members of the Division in the first quarter of the twentieth century; the enumeration would fatigue the reader and burden the printer. In a period of some thirty years, three received honorary degrees, two were elected to honorary membership in the Göttingen Academy of Science, one to corresponding membership in the French Academy, and three to membership in the American National Academy; four won international mathematical prizes; while a fifth received honorable mention in such a competition. Many gave important addresses or served on important committees or commissions, national or international. In 1926 an important step was taken by the Governing Boards in awarding to one of the professors, George David Birkhoff (A.B. 1905), a Cabot Fellowship, with the stipulation that he should give at least half his time to scientific research.

A second tradition took form and substance during this period. All members of the Division enjoying presumably permanent appointments, came to take equal shares, not only in the privileges, but also in the responsibilities involved. Every young teacher is anxious to give the most advanced instruction possible. He imagines that if he can offer lectures on some new and peculiarly recondite subject he will become indispensable to the institution. This ambition should be encouraged in moderation, provided that the student body does not suffer thereby; but in many institutions it is the custom of the senior teachers to monopolize the advanced courses, leaving few crumbs for their younger brethren. Not so at Harvard. There was a tradition, started apparently by J. M. Peirce, that all members of the brotherhood should receive the same treatment in this respect, and this tradition was based on sound reasons of justice and policy. It is not fair to a young man to make him feel that he is expected to show himself capable of doing work of the highest order, and then restrict his opportunity to do that work; and nothing can be a greater inspiration to a young man of the better sort than to find that he receives the same treatment as men twice his age and ten times his eminence.

This policy of like treatment for all members, once recognized in the Division, was found to have further implications. If the youngest might share in the most advanced instruction, so should the oldest take their fair share of the vital work of teaching Freshmen and Sophomores. It seemed only just that an able undergraduate who was anxious to come under the instruction of the most distinguished professors should have the opportunity to do so. Moreover, the Governing Boards warmly supported this point of view, and favored every effort to remove the popular misapprehension, based on the examples of such men as Benjamin Peirce, that a profound scholar must *ipso facto* be a lamentable teacher. And lastly, the policy of equality of burden was of the highest value in maintaining the esprit de corps of the Division.

Perhaps the word 'burden' is ill-chosen in this connection, for the members of the Division were never oblivious of their duty to teach, and to teach well. The gradual transformations in the form of undergraduate instruction were the outcome of careful experiment, and the necessity for meeting changing conditions.

A double crisis occurred at the beginning of the presidency of Lowell. The unrestricted system of free election of studies, which had been developed during the previous régime, was modified by a new requirement that each student should choose one field for 'concentrated' study, and should devote some attention to each of a certain number of other recognized fields.[1] But what are fields? The practical outcome of any such plan would depend almost entirely upon the way in which the various branches of science, art, and letters were subdivided, and any method of subdivision was bound to be largely arbitrary. The Faculty of Arts and Sciences decided that the number of fields for 'distribution' should be four, three following the natural classification of letters, history, and the experimental sciences, the fourth consisting of the rather strange bed-fellows philosophy and mathematics. This meant that every student would have to take at least one course in one or the other of these topics, and that the amount of elementary instruction in philosophy and mathematics would have to be increased to an unpredictable extent. At the same moment President Lowell, who had been an honor student of mathematics under the two Peirces, expressed the opinion that it was anomalous that elementary mathematics should be taught separately in Harvard College and the Lawrence Scientific School. The reasons for this practice were obvious enough. It was supposed that those who studied mathematics to acquire a tool for engineering did not need to be burdened with the refinements of theory which were suitable pabulum for those studying the subject for its own sake. This reasoning, though plausible, was fundamentally wrong. The professors of engineering were the first to recognize that what their students needed was sound mathematics well taught (which is what all students need). Now, mathematics had not been well taught in the Lawrence School, for there was nothing that School could offer to a prospective mathematical teacher which would tempt a man of ability.

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[1] See the editor's introductory chapter on College Studies.

Such was the situation that confronted the Harvard mathematical teacher: An immediate increase in the lower classes in the number of students who chose the subject, not because they loved it more, but philosophy less; and, in addition, all the students of the Scientific School who were required to take the subject for professional reasons. It is possible that if the Division had opposed these changes vigorously, they might have deranged the whole, but such an idea never occurred to them, for their action would have been both shortsighted and selfish. On the contrary, they undertook the new responsibilities gladly, but pointed out to the Governing Boards that the additional strain on the teaching staff should be relieved by the appointment of at least one new man, not necessarily a specialist in elementary teaching, but capable of strengthening the Division in all its activities. The Governing Boards appreciated the situation, and the desired appointments were made. The expected increase in students also took place. The average number of Freshman students per year in the years 1905–07 was 130; in the years 1910–14 it was 232.

Another increase in the responsibilities of the Division occurred almost at the same time. The Visiting Committee of the Board of Overseers, under the chairmanship of William Lowell Putnam (A.B. 1882), prepared in 1913 an able report containing the important suggestion that the bulk of the Freshmen be taught in small sections, say of twenty men each. How could such a recommendation, however excellent in theory, be put into practice? It was financially impossible to increase the mathematical personnel to such an extent that some twenty small Freshman sections should be conducted by members of the permanent staff, all of whom were giving a due share of their time and strength to the vital work of advanced instruction and scientific research. On the other hand, the Division were absolutely opposed to the creation of any Helot body of 'mere teachers.' The only plan seemed to be to nominate a large number of temporary teachers, young men of ability, who should give part of their time to teaching and part to study. The solution was not ideal, but on the whole worked well. The members of the permanent staff exercised a close supervision over the work of the neophytes, advising and criticising those who needed advice and criticism, and weeding out any unteachable teachers. Incidentally, many young men of real promise were enabled in this way to continue their study and proceed to the doctor's degree.

The Division took advantage of the great changes in arrangement, which have just been described, to take the bold step of introducing a certain amount of differential calculus into the Freshman programme. The amount was gradually increased until one half of the Freshman course was devoted to the subject, and in 1922 the Faculty of Arts and Sciences, through the President's deciding vote, passed a motion that no course in mathematics should be acceptable towards meeting the requirement for 'distribution' where the calculus was not taught. This was in that same Harvard College which, up to 1802, would admit a boy who did not even know arithmetic. In 1925–26, 327 young men, just out of secondary school, were receiving a half-year of solid instruction in the differential calculus.

The creation of the Graduate School of Education presented the Division with another opportunity. It seemed perfectly clear that the School must take some steps towards the training of teachers of secondary mathematics. The Division might very well have taken the ground that secondary teaching was none of its affair, but such selfishness would have eventually brought its own punishment. A policy of cordial coöperation was far preferable, and this was carried out through the appointment of a joint professor, who was the more able to help his pupils in the School of Education, because he was himself teaching Freshmen in Harvard College.

It has been shown that the mathematical renaissance throughout America generally, and at Harvard in particular, was the work of men who had come under German influence. The German tendency in American higher education reached its culmination at about the moment of Lowell's election to the Presidency. Shortly thereafter there was a decided swing in the opposite direction, and there arose a strong feeling that it would be well to profit by English experience, especially that of

Oxford and Cambridge. There was widespread dissatisfaction with the American 'scoring' system which consisted in studying *seriatim* a specified number of topics which might have no bearing whatever on one another, no unifying principle internal or external; passing an examination in each as soon as the lectures were completed; and receiving a degree at the end in the hope that some subconscious mental process had fused the whole into a mass which might be called knowledge, if not wisdom. It became evident that means must be found to develop in the student some ability to synthesize. The best means were found in the adoption of a system of general examinations, and in provision for a body of tutors whose duty it should be to exercise a general oversight over the student's education.

The important changes involved in a tutorial system were first introduced in the historical and literary departments, as it was felt that in the sciences, especially in such sciences as mathematics, there was an inherent unity and natural order which prevented a student from attempting the advanced until he had really mastered the elementary. Nevertheless the members of the Division of Mathematics watched the progress of the experiment with interest, and decided in 1925 that, in spite of the special nature of their subject, they might well introduce the new methods of general examination and tutorial instruction. The general examination presented no difficulties; not so the question of tutors. It was felt that the position of Tutor in Mathematics might not seem to lie on the high road to academic or scientific advancement, and so might not appeal to young men of the most promising sort. On the other hand, as already explained, the Division did not believe in adding to its ranks a permanent tutorial personnel of confessedly inferior scientific capacity. Lastly, it seemed unwise to have a continually changing tutoring staff; the results would be mediocre, and the number of temporary appointees was already as large as it was wise to allow. The difficulty was very serious, and the only way to meet it seemed to be to act boldly. It was therefore proposed that each member of the Division should be relieved of one sixth or one third of his instruction, and that the time and strength so saved should be devoted to tutoring five or ten individual undergraduates specializing in mathematics. It was calculated that, in order to carry out this programme without any diminution of advanced instruction and scientific activity, the appointment of at least two new permanent members of the Department was necessary. The Governing Boards were informed that on these conditions, and these alone, the Division would be glad to try the plan. The Governing Boards approved, and the appointments were made in 1926.

It will be seen that the Division faced all of these critical situations in the same spirit, and followed the same general guiding principles. They steadfastly refused to admit that their scientific activity was more important than their work as teachers, or vice versa. The two must be made complementary, not conflicting. So too, when new questions arose, and new responsibilities seemed imminent, it was felt to be the duty of the Division to meet every demand that could legitimately be placed upon them, to render every real service to the University that lay in their power. But every acceptance of new responsibility must be made to augment rather than restrict their capacity to fulfil those perennial duties to science and to education which 'age can not wither, nor custom stale.'

XVI. CHEMISTRY

1865–1929

By Charles Loring Jackson, A.M.
Erving Professor of Chemistry, Emeritus
and
Gregory Paul Baxter, Ph.D.
Theodore William Richards Professor of Chemistry

1. Instruction, 1865–1912[1]

In 1865 the teaching of chemistry in Harvard College, which had remained unaltered for seven years, consisted principally of required courses in the Sophomore and Junior years: dreary recitations from textbooks, some on chemistry, but more on 'chemical physics,' which had no connection with chemistry except in its title. There was however one oasis in this dismal waste: a course of experimental lectures (two hours a week for a year) by the one Professor in the Department, Josiah Parsons Cooke (a.b. 1848), a brilliant lecturer, and a master of the difficult art of making lecture experiments succeed. These lectures began in 1850, and ended only with the death of Professor Cooke in 1894. They were so effective that, when toward their end they were made voluntary, the crowd still overflowed into the entry, the back row even standing on the banisters to see the experiments.

In addition to these required courses there was an elective in Qualitative Analysis — not the meagre allowance it would seem at present for so large a subject as Chemistry; but ample, when there were only two electives in the Junior, and one in the Senior year. In any case Chemistry had no right to complain, as, in addition to the one scientific elective, it had at least a year more of prescribed work than any other scientific subject, unless indeed Mathematics was counted as such. This preponderance was due, I have been told, to Cooke's genius for introducing courses by gradual unsuspected approaches (what we should now call 'peaceful penetration'): at the time the only way, because a frontal attack on a faculty with a large hostile majority could end in nothing but disaster. His method may be summed up in the phrase — 'Give me an inch, and I will take an ell.' And it had the happiest results for the College as well as for the Chemical Department, since his efforts did more to introduce science into Harvard College than those of any other man of that period. The great scientific professors (Louis Agassiz, Wolcott Gibbs, Asa Gray, and Jeffries Wyman) not being members of the Faculty, and therefore without even a vote, could help the good work only by the influence of their great prestige.

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[1] This and the following section are by Professor Jackson (a.b. 1867).

In the elective course in Qualitative Analysis, Cooke's hands were not tied to the inadequate recitation method which was forced on him in the required courses by his colleagues in the Faculty; he taught the subject by practical work in the laboratory, and made it also an admirable intellectual training. A few years later, after Professor Henry Barker Hill had perfected this method of teaching, it became the greatest educational treasure of the Chemical Department. On the other hand, a teacher whose only object was to train accomplished analysts, could easily degrade the laboratory method to a mere mechanical routine with little educational value.

It was in 1868 that real growth began, when Cooke introduced a new elective, Crystallography and Mineralogy (then classed under Chemistry). If in introducing this there were some indications of the elaborate stealthy approach which I have called peaceful penetration, it was the last time it was necessary. For in the spring of 1869 a chemist, Charles W. Eliot, became President. With his powerful support, and the scientific professors added by him to the Faculty, any reasonable addition to the electives in science was certain of adoption.

Before 1871 chemistry was taught by two distinct and independent branches of the University, each with its own laboratory: the Lawrence Scientific School, in which Wolcott Gibbs trained men to become chemists; and Harvard College, where men took courses in Chemistry as part of a liberal education under Josiah Parsons Cooke. In that year, however, President Eliot transferred the subject from the Scientific School to the Chemical Department of the College, putting Wolcott Gibbs into the Department of Physics in the College, where he lectured to small but very select audiences.

From a material point of view this was a good move, as the chemical students from the Scientific School were absorbed without additional expense, thus saving the whole cost of maintaining a second laboratory; but, if looked at from the higher interests of the University, it must be considered a serious mistake. Wolcott Gibbs, the first American chemist of that day, was thereby deprived of all advanced students in chemistry, thus reducing the number of his papers to the work of his own hands, and those of a private assistant paid out of his own pocket. I think that if this change had been proposed later, after President Eliot had learned that research was essential to a great university, he would not have made such a mistake.

President Eliot was hardly in the saddle before he proposed a new course in elementary chemistry to be taught partly in the laboratory. It was launched in the autumn of 1870, and was soon numbered Chemistry I. Although not an easy course, the number of students in it increased from some forty to over four hundred at the beginning of each of the last years before its end in 1912. One of the principal reasons for this great increase was the considerable attention given in 'Chem. I' to the chemistry of common life, with which sugar the class managed to swallow the thorough teaching in pure chemistry needed as a foundation for the higher electives, and found it not so unpalatable. Some idea of the variety (but not of the number) of these applications of chemistry can be given by the mention of a few selected at random: the raising of bread, extraction of cast iron from its ores and its conversion into steel, respiration, the theory of manures, bleaching, the manufacture of glass, and photography.

After this new courses followed in quick succession: Quantitative Analysis (Chemistry 4) in 1871, and later the teaching in this subject was completed by the addition of two higher half-courses: Advanced Quantitative Analysis (9), and Gas Analysis (10). In 1873 Henry Barker Hill (A.B. 1869), eldest son of President Hill, introduced an elective in Organic Chemistry (5), to which were added later a more elementary course (2), and one more advanced (17).

In 1886 Cooke introduced an experimental course in elementary theoretical chemistry (B) corresponding to the entrance requirement just adopted by the College, but our efforts to fit it into our well-articulated system of electives failed. It was dropped in 1902 after Cooke's death, and the money and room thus set free used to greater advantage for the Department.

JOSIAH PARSONS COOKE

WOLCOTT GIBBS

Even before 1870 the simple chemical theories of that day were studied under the somewhat grandiloquent name of Chemical Philosophy. As they grew more complex, this prescribed teaching was replaced by an elective half-course in theoretical chemistry (8) under Professor Theodore William Richards (A.B. 1886), who added a sketch of the history of the science to a more thorough discussion of these theories. This was supplemented in 1894 by Physical Chemistry (6), at that time a new branch of the science, taught after the first year by Richards. This was an advanced course like the corresponding one in Organic Chemistry (5), and the two formed the portal leading to research. Richards's course on Chemical Theory already mentioned served as a preparation for this course, as the Elementary Organic Chemistry (2) did for the advanced course in that subject (5). Half-courses in Electrochemistry (7) and in Photochemistry (12) carried on the study of physical chemistry for those specialising in it.

To fit men for places in the chemical industry we taught them how to solve chemical problems by practical work in research. As the methods in almost every branch of chemistry are the same, such training would be of use in any field; whereas a man who had devoted the same amount of time to detailed study of different branches of industrial chemistry would find most of that study useless, as it would not apply to the particular work on which he was engaged. For instance, a man for many years engaged in the alkali industry told me that he had never met a difficulty he could not overcome, although his training had consisted in an abstruse research on furfurane compounds, and it would be hard to find two branches of chemistry less related to each other. This plan was successful even at first, when we gave no teaching in industrial chemistry beyond the fragmentary and general account of it embedded in Chemistry 1. It became much more effective when joined with a course giving a comprehensive view of the differences between industrial and pure chemistry. Charles Robert Sanger (A.B. 1881) gave such a course in 1902 and 1903, when it was crowded out by his exacting duties as Director (business manager) of the Laboratory. Industrial Chemistry was offered at intervals, whenever temporary arrangements could be made, but was not put on a permanent basis till after 1912.

In 1904 Lawrence Joseph Henderson (A.B. 1898) introduced a course in Physiological Chemistry treated as a liberal study, instead of as the detailed and technical training needed in the Medical School.

To sum up the growth of the Department: in 1865 the only really effective teaching in chemistry was the one elective, in Qualitative Analysis; in 1912 courses were given in over fourteen different subjects, covering together every important domain of the science. Equally important was the fact that research courses had been established. Beginning in 1875 with but one man, this teaching in research almost immediately began to grow in variety and in number of students, each of whom devoted the whole of his time to a research with one of the professors, and received the special personal teaching needed by his problem, the results as a rule being published in a joint paper. The account of the research of the Department, to be given presently, has therefore included the teaching of these students.

The satisfactory growth in the amount and variety of the teaching given by the Department is in strong contrast to its material increase, which consisted of one dreary makeshift after another, as want of money shut us off from building a new laboratory, the only good way of providing for the increasing number of students. We were confined therefore to Boylston Hall, built in 1858 for only 40 laboratory students. Although ample for the needs of the Department at first, the need of larger quarters soon became imperative, and in 1871, a new story was added to the building by raising the roof: the first of the long line of makeshifts. This gave effective relief for several years, but although Comparative Anatomy withdrew in 1875, and Mineralogy in 1891, leaving the whole building for Chemistry, the classes still grew, until they reached over 600 students. Fitting them into this antiquated building became more and more like the hardest of Chinese puzzles, and taxed to its utmost the ingenuity of the Directors of the Laboratory (Cooke and his successors H. B. Hill and Sanger).

The greatest difficulty was to find room enough for the 400 and more students in Chemistry 1. New laboratories were equipped, which gave them quarters — but such quarters! Two cellars, one beneath Boylston Hall, the other a new one excavated between it and the street!

2. Research, 1870–1912

Before the decade beginning with 1870 the Chemical Department of Harvard College produced little original work. The wonder is that it published anything, since its only permanent officer, Cooke, was without training in this difficult art. The papers of this period, when he was teaching himself the methods of research, are therefore of less importance than those he published later. On the other hand Wolcott Gibbs, a thoroughly trained chemist, was pouring forth a continuous stream of important papers from the laboratory of the Lawrence Scientific School, but his work had to do with the most difficult and recondite branches of inorganic chemistry, such as the cobaltammines and complex acids, and therefore was known and appreciated only by expert chemists.

In 1870 H. B. Hill came home from the Berlin laboratory, overflowing with enthusiasm for research in organic chemistry, but with no training in it. The years that immediately followed were spent by him in trying to work out methods by himself, until by 1873 he had made enough progress to undertake a series of promising investigations. But by almost incredible bad luck they had yielded no results even as late as 1875.

The two years between 1873 and 1875 were passed by me in Germany principally in the study of research under A. W. Hofmann, and proved that I could work successfully in this line under his direction; but could I do it without a teacher? I had my doubts, and they were intensified by Hill's unfortunate experience.

The autumn of 1875 was therefore an anxious time for both of us, as it ought to show whether we were capable of independent research. Fortunately, soon after the beginning of the college year I was able to settle this question, when the easy research I had selected brought me to the point of trying to make a new compound; success would open a new era for us and the Harvard Laboratory. So when the fused brown product of my experiment began to deposit white crystals, which could be only the new substance, we felt like dancing about the laboratory. This parabrombenzylbromide was the first of the hundreds of new compounds which since then have flowed in a stream from our laboratory and have given it an important place in the world of organic chemistry.

It was the first new organic compound made at Harvard, but not in America. Ira Remsen for several years had been doing successful work in organic research, and to him belongs the honor of having introduced it into this country. Our laboratory, however, can justly claim that it was the first to join him in the long, hard struggle to give this branch of research a footing in America, and that it did its share or even more in the struggle. We were happy if the educated public received us with indifference instead of with scorn and jeers.

I wish H. B. Hill could have lived to the present day, when chemistry has come to its own in this country with a completeness we did not hope for in our wildest dreams. He certainly ought to have had the credit of making the first compound at Harvard, for with even average luck he would have made several long before the discovery of parabrombenzylbromide. He made his first new substance, methyluric acid, a few months later; and his paper describing it was much more important than the usual announcement of a few new compounds, as it contained a new method of research — a rare thing in any paper, and, so far as I know, unique in a first one.

Hill was attracted away from the study of methyluric acid, by a more promising piece of work, the investigation of furfural. This was a compound of the first interest, as it promised to be the mother-substance of an important series of compounds, but at that time it was so rare that it cost eighty dollars a kilogramme, and had naturally been little studied. Hill found that it was the principal by-product from a new method for making acetic acid, carried on by the celebrated pharmaceutical chemist, Dr. Squibb, who insisted on giving it to him in unlimited quantities, and would not allow him even to pay for the carboys or the freight from New York. Such an opportunity has come to few chemists, and Hill made the most of it, converting the furfurane compounds (furfural and its derivatives) from an unexplored waste into one of the best known of the larger fields of organic chemistry; and extending his work to their more distant relations, such as the substituted propionic, acrylic, and propiolic acids, and especially the nitromalonic aldehyd, which proved an admirable starting-point for a series of interesting syntheses: an enduring monument!

After H. B. Hill's too early death in 1903 his successor, Henry Augustus Torrey (A.M. 1896), produced a series of excellent researches, cut short by his death only seven years later. Among his more important papers were a series on phenols insoluble in alkalies, and another on derivatives of iodanil.

I was fortunate enough to be able to continue my researches until 1915.[1] My most striking discoveries were: a synthesis of anthracene; the determination of the connection between curcumine (the yellow coloring-matter of curry-powder) and vanilla; a startling new method for making trisulphonic acids; and an improvement in the preparation of trinitro compounds, which made it possible to prepare several not formed by the older process, and probably would have increased the yield of trinitrotoluene, but unfortunately was unknown to one of our large war-time manufacturers of this important high explosive (T.N.T.). It is to be hoped it was also overlooked by the Germans. To these may be added a series of strange compounds from orthoquinone. But my most important piece of work was the explanation of the mechanism of the sodium malonic ester reactions, which I discovered only after a search lasting twenty-five years.

The important discoveries of Lawrence J. Henderson in physiological chemistry were made at a later period with one exception, and therefore do not belong here. This one exception, however, is of fundamental importance, as it showed how the blood retains its normal reaction even in presence of an excess of acid or alkali.

In hygienic chemistry Professor Charles Robert Sanger proved experimentally that the symptoms of poisoning, earlier only supposed to be due to arsenical wallpapers, were in fact associated with the presence of arsenic in the bodies of the patients.

This rapid progress of research in organic and physiological chemistry was even outstripped by that in inorganic and physical chemistry. Cooke began this work in 1873 by painstaking determinations of the atomic weight of antimony, and continued it later with a study of the fundamental relation between the atomic weights of oxygen and hydrogen by burning a weighed amount of the latter gas.

Associated with him in this last research Theodore W. Richards[2] appeared for the first time in this field, which he afterwards made so emphatically his own. A few years later, when his pupil Gregory P. Baxter (A.B. 1896) also took up this line of work, the Harvard Laboratory, with the first and the second authority on atomic weights, became the best place in the world for the study of this branch of chemistry, and drew advanced students from foreign universities. Even the University of Berlin sent one of its younger teachers to Cambridge to study this branch of research under Richards.

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[1] With men a large part of whose original work belongs in this period (1865–1912), it seems best to consider the whole of it up to the present day (1927), rather than to cut short the account arbitrarily at 1912.

[2] Professor Richards revised this account of his work shortly before his death (April 2, 1928), so that it is an authoritative statement so far as it goes.

The experimental work in this field demands the utmost skill and delicacy in manipulation, endless patience, and the greatest accuracy; while its intellectual side calls for the best and best-trained judgment in the choice of the processes and compounds which will give the most accurate results, penetrating insight to detect errors, particularly the elusive constant ones, and the greatest ingenuity in devising methods for their elimination.

Errors cannot be avoided entirely. Although errors by balancing each other frequently give a result not far from the truth, it is obvious that if the errors are large, the result is so much a matter of chance as to be of little value. The problem at present, therefore, is to get rid of as many of these errors as possible, and reduce the size of the rest, until they have no appreciable influence on the result.

A simple example will give some idea of the minute precautions necessary. The most common error is caused by an impurity of water in the product weighed, which increases its weight, even if it does not decompose it partially. The earlier chemists found it not so hard to exclude moist air during the preparation of the substance, but, when it was transferred to the weighing tube, it was exposed for a few seconds to the atmosphere, and even the mere trace of water absorbed in that time had an appreciable effect on the weight. This source of error Richards removed completely by devising an apparatus in which the substance was transferred to the weighing tube, and this was stoppered in an absolutely dry atmosphere excluding contact with the outer air. This 'bottling apparatus' was only a small part of an ingenious apparatus in which the product was prepared by the use of gaseous reagents, each process being carried on in an atmosphere specially adapted to it.

I have selected for description the work on this impurity from the outside, because it can be understood easily. To remove the more insidious ones formed in the chemical reactions themselves is much more difficult, and it would be hard to explain the methods to the general reader.

Richards also invented another piece of apparatus called a nephelometer, which added greatly to the accuracy of the work, as it made possible the detection and measurement of the clouds formed in a liquid by quantities of a precipitate so small that they were invisible to the unaided eye.

By 1912 Richards had revised the atomic weights of nineteen elements, Baxter of thirteen, and they had studied three together. Their work is the most accurate that has ever been done in chemistry, even surpassing that of their best predecessor, Stas, whose results had been considered final until they detected serious errors in some of his most important determinations. By his study, with Baxter and Cushman, of the atomic weights of cobalt and nickel, Richards also proved that the atom of nickel is the lighter of the two, hence nickel cannot be fitted into the old scheme of the elements on the periodic system referred to the atomic weights. This was a striking result, as only two other elements, tellurium and argon, do not fit into the system for that reason. Later this conclusion was confirmed by two other chemists using different methods of attack, although both were founded on the optical properties of the elements.

The study of the decay of elements with large atomic weights, which followed the discovery of radium, suggested to certain theorists the hypothesis that the lead found in minerals containing uranium (the element with the largest atomic weight) might have been formed from it by the loss of the gaseous element helium. But as the atomic weight of helium is 4, and that of uranium 238.2, it is impossible to obtain an atom of lead weighing 207.2 by removing atoms of helium from it. The loss of 7 or 8 atoms of helium would give 210.2 or 206.2, respectively. Therefore, if this lead is formed from uranium it should have one of these values instead of 207.2.

At this point the chemists in different parts of the world, who had specimens of the lead which might have been formed from uranium, decided to send them to Richards, with the request that he would determine its atomic weight — a wise move, as it provided a sufficient amount of this rare material for thorough purification, and, better still, placed the determination of the atomic weight in the hands of a master, whose results were above criticism.

With the help of Dr. Max Lembert, who came from Karlsruhe for this purpose, Richards purified the several specimens with the utmost care, and after treating a sample of common lead in the same way, compared these preparations. Nearly all the properties by which substances are usually recognized (such as chemical reactions, or the melting points of metals and salts) were found to be identical; but when the atomic weights were determined, common lead gave as usual the atomic weight 207.2, while the uranium lead gave about 206. This value agrees with the calculated 206.2 within the limits of error in the determinations of the atomic weight of uranium, upon which the latter figure is based, thus for the first time placing the hypothesis of the disintegration of the elements on a safe numerical foundation, and also confirming the hypothesis that an element may exist in two different forms (called isotopes) alike in every respect except in properties allied to the weight and mass of their atoms.

A little later Baxter made an important contribution to our knowledge of this subject by the examination of many specimens of common lead (not derived from uranium) found in widely separated parts of the world, and in every case found that their atomic weights were 207.2. By a similar investigation of the atomic weight of iron he has proved that there is no difference in specimens of this element obtained from the most various terrestial sources, or even falling from space in meteorites, and that the same is true in the cases of cobalt and nickel.

In addition to his work on atomic weights, Richards carried on researches of the first importance in four other distinct departments of chemistry: chemical equilibrium, electrochemistry, thermochemistry, and atomic compressibility. Even if I had space for an account of his discoveries in these fields, it would be almost impossible to make them intelligible to the general reader. I shall therefore confine myself to a brief statement of the theory of atomic compressibility invented by him to explain the constitution of matter.

It assumes that atoms are not minute, hard, massy lumps, but rather centers of repelling force, and especially that their apparent bulk is influenced by pressure applied to them. By studying this apparent bulk he was able to draw inferences concerning the intensities of the forces which pull the atoms together in liquids and solids, and in the formation of compounds. Thus, whenever two atoms come together, the pressures of the combining forces work against the repelling forces, producing distortions, the nature of which depends on the number and character of the atoms taking part. For instance, when the atom of carbon combines with four others, the pressures developed squeeze it into a tetrahedron: the form already selected for this atom by the organic chemists to explain a large number of facts observed in an entirely different connection.

Although this theory was in harmony with all the facts then known, it was received with incredulity by many scientific men — the common fate of new theories. In 1928, after a quarter of a century, its main ideas are beginning to be generally accepted, because countless experiments by Richards and others have confirmed many of its predictions. If in the future the experimental study in this field supports it as well as in the past, the theory of atomic compressibility may be expected to take its place in some form among the fundamental theories of chemistry.

3. The Period 1912–1929[1]

The year 1912 was a critical period in the history of the Division of Chemistry.[2] The premature death in 1910 of Henry A. Torrey, Assistant Professor of Organic Chemistry, had deprived the Division of an inspiring teacher and an investigator of great promise, whose service in the University had begun only in 1903. A second untimely death, that of Charles R. Sanger in 1912, left the subject of qualitative analysis without the guidance of one of the foremost authorities in the subject. Professor Sanger also had charge of instruction in industrial chemistry besides serving as business director of the Chemical Laboratory. In addition, Charles L. Jackson, who since 1870 had conducted the wonderfully successful course for beginners (Chemistry 1), owing to ill health found himself unable to continue his regular duties. The few remaining permanent members were thus faced with a wholesale reorganization of the Division. Fortunately all the men invited to cast their lots with the Division elected to do so: Elmer P. Kohler (PH.D. Johns Hopkins 1892), who had been for many years head of the Chemistry Department of Bryn Mawr

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[1] This section is by Professor Baxter.

[2] Since the organization of the Faculty of Arts and Sciences in 1891, Chemistry has been a Division, without any subsidiary Department.

College; Dr. Arthur B. Lamb (A.M. 1903), at the time head of the Chemistry Department of New York University; and Dr. Grinnell Jones (A.M. 1905), Instructor in Chemistry in the University of Illinois. A little later Dr. Arthur Michael, Professor Emeritus in Tufts College and internationally famous as an organic chemist, was persuaded to join the staff. Until the present year no other major change in the personnel of the Division occurred, except that, from the group of more or less temporary instructors, there emerged the brilliant organic chemist Dr. James B. Conant (A.B. 1914), who was made Professor in 1927. In the spring of 1928 a crushing blow was suffered by the Division in the sudden death of Theodore W. Richards, Professor since 1894.

During the past sixteen years the instruction offered by the Division has altered comparatively little. Until 1928 expansion was prohibited by cramped and inadequate quarters. At times educational experiments in certain directions have been made, especially in the separate handling of the two groups of beginners, those who have studied the subject in preparatory school and those who have not. Laboratory work for beginners in organic chemistry was made possible through the relief afforded by the building of the new small laboratories, and this in turn led to a highly successful innovation in the assigning of minor research problems to the more capable students in the second course in this subject under Professor Kohler. Alterations in the arrangements of courses have contributed somewhat to the flexibility of the programme of a student specializing in chemistry. But since the curriculum in chemistry consists almost entirely of fundamental subjects indispensable to the specialist, the opportunity for variation has been slight.

The establishment of the Harvard Engineering School in 1918 presented a difficult problem. Laboratory instruction in Chemical Engineering proper was out of the question with the facilities available. But in order that chemistry might hold its place in the Engineering School until chemical engineering could be placed on a proper footing, a programme entitled Industrial Chemistry was established, in which a lecture course outlining the applications of engineering to chemistry was included in a specialized arrangement of courses in chemistry, physics, and mathematics. While this programme does not differ in any respect from one which might be elected by a student specializing

HENRY BARKER HILL

THEODORE WILLIAM RICHARDS

in chemistry in Harvard College, it provides a broad and adequate training for those intending to enter the chemical side of manufacturing chemistry. Ultimately laboratory facilities for instruction in the technical side of industrial chemistry, together with instruction and research in chemical engineering, would be a suitable part of the offering of the Harvard Engineering School.

As to physical equipment, the year 1912 marked a turning point in the history of chemistry in the University. For many years the material needs of the Division of Chemistry had been a steadily increasing cause for anxiety, with regard both to efficiency in operation, and to safeguarding the health of staff and students. Boylston Hall, originally constructed for purposes quite different from those for which it was being used, had been completely remodelled and enlarged, but at the best was only a makeshift, and for some years had been incapable of housing the whole Division. In 1904 a glassed-in extension (the 'conservatory' or 'Crystal Palace') was constructed on the Massachusetts Avenue side. Some years later, the lower story of Dane Hall was converted into a laboratory for qualitative analysis, to the annoyance and dismay of the occupants of the Bursar's Office overhead. But until 1912 the continuous and conscientious efforts of the Division and of the Overseers' Committee to Visit the Chemical Laboratories, had been unavailing in the matter of raising funds for new buildings.

At this time, however, through the generosity and interest of Dr. Morris Loeb (A.B. 1883) and many other friends of the Division, a fund was secured to build and endow a laboratory for research in physical and inorganic chemistry, to be named the Wolcott Gibbs Memorial Laboratory, and to be under Richards's direction. Since it was hoped that this laboratory was but the beginning of a complete new chemical plant, a large tract of land between Oxford Street and Divinity Avenue was set aside by the Corporation for that purpose. The Gibbs Laboratory was begun late in 1911 and occupied early in 1913. This building is still unique in its suitability for precise investigation in physical chemistry, in stability, convenience, and freedom from dirt and fumes.

The construction of the Gibbs Laboratory was hardly more than under way when a second small laboratory became possible through the generous gift of sixty thousand dollars by T. Jefferson Coolidge (A.B. 1850), in memory of his son, of the class of

1884. This new T. Jefferson Coolidge, Jr., Memorial Laboratory (begun in 1912, occupied late in 1913) was assigned to Quantitative Analysis, and has been used for both elementary and advanced work, as well as research in that subject under the writer. Like the nearby Gibbs Laboratory it is especially adapted for work of a precise nature. The hopes of the Division that the complete plant for instruction in chemistry would soon materialize were disappointed by the advent of the war; and it was not until 1926 that a further step was possible. In the campaign led by Bishop Lawrence and Dean Donham, three million dollars became available for the construction and maintenance of chemical laboratories to replace Boylston Hall. The first gift for chemistry, half a million dollars, was made by the late Edward Mallinckrodt of St. Louis.[1] Another of equal magnitude was made by the General Education Board. A third, slightly less, by the heirs of Edmund Cogswell Converse, was made for the construction of a laboratory for research. The Harvard Corporation created a fund of half a million for the maintenance of research, and, in addition, appropriated half that sum toward the building fund.

Larger numbers of students and increasing requirements, together with the high costs of construction, precluded, in designing the new laboratory, the plan already begun in the Gibbs and Coolidge Laboratories of erecting a group of small units, each of which should be devoted to one branch of the subject. Instead, a large main building, the Edward Mallinckrodt Chemical Laboratory, was built parallel with Oxford Street, and a smaller building, named the Converse Memorial Laboratory, connected with it in the rear. Both were begun in the early part of 1927, and completely occupied in January, 1929. The Converse Laboratory, which contains the Chemical Library, is devoted to investigation, chiefly in organic chemistry, and to the advanced courses in which a research problem is part of the work. Except for advanced quantitative analysis and the portion of research in physical and inorganic chemistry housed in Gibbs and Coolidge, the remaining branches are provided for in Mallinckrodt. Of first-class construction, with ample and up-to-date equipment, these laboratories for the first time in more than fifty years provide suitable facilities for the teaching of chemistry in Harvard University.

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[1] Father of Edward Mallinckrodt (A.B. 1900).

From 1912 to 1929, the number of undergraduates studying chemistry has not changed materially, but the number of graduate students has increased notably. The latter play a very important part in the operation of the Division. As research students they greatly promote the productive work of the staff; as assistants they take charge of a large portion of the laboratory instruction in the more elementary courses. The proportion of these graduate students who began their work as undergraduates in Harvard College is not large, seldom exceeding one-quarter. The remaining three-quarters are picked men from all parts of the country, with occasional visitors from abroad.

Under the plan for 'concentration and distribution' in Harvard College,[1] chemistry has been a popular subject, ranking third or fourth in point of numbers for many years. Very recently a marked falling off has resulted from the establishment of the 'concentration' field of Biochemical Sciences, planned for students intending to enter medical school. These men still study chemistry more or less intensively and are under special tutorial direction intended to emphasize the relations of chemistry, physics, and biology to medicine.

At the time of writing the Division of Chemistry is one of the few which have not formally adopted the general examination, and tutorial instruction, for the bachelor's degree. In practice, tutorial supervision began in chemistry through the constant oversight of and contact with students in the laboratories, years before it became systematized in the College. Yet the highly articulated character of chemical training renders general examinations so much less necessary than in many other subjects, that the Division has not yet regarded the advantages to be gained as outweighing the disadvantages.

Experimental research, which was begun in the Harvard Laboratory by H. B. Hill and C. L. Jackson in the field of organic chemistry over fifty years ago, was continued with ever increasing vigor during this latest period. In the past sixteen years over four hundred papers in various fields of investigation have been published from the chemical laboratories. The more important investigators, with topics covered by them, are as follows:

Professor Michael: the theoretical interpretation of the mechanism of chemical changes in organic substances.

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[1] See introductory chapter on College Studies.

Professor Kohler: the addition reactions of substances containing conjugated systems of multiple linkages; the mechanism of reactions in which cyclopropane derivatives are converted into open chain compounds; isoxazoline oxides, a new type of cyclic nitrogen compound; pseudo bases and their salts in the isoxazole series; the tautomerism of isoxazolones.

Professor Conant: the addition reactions of unsaturated compounds, in particular the action of phosphorus halides on carbonyl compounds; electromotive studies of the reversible oxidation and reduction of organic compounds such as the quinones; quantitative studies of irreversible oxidation and reduction reactions; the rate of reaction of organic halides; the chemistry of haemoglobin; a study of the factors responsible for the dissociation of certain carbon compounds into free radicals.

Professor Henderson: physico-chemical equilibria in the blood; cosmology.

Professor Richards: the determination of atomic weights, especially those of lead isotopes; thermochemical measurements with the adiabatic calorimeter; electromotive force determination of certain metals and amalgams with their theoretical interpretation; the determination of the compressibilities of elements and compounds and the correlation of this property with atomic and molecular volume, surface tension, and heat of evaporation; the estimation of internal pressures from compressibilities.[1]

Professor Baxter: the determination of atomic weights by chemical and gas density methods; the measurement of the deviations of gases from Boyle's Law at low pressures; the determination of change in volume during the solution of salts in water and the correlation of this change with atomic and molecular volume and compressibility; the determination of the vapor pressures of pure substances; the determination of the aqueous pressures of salt hydrates; studies of analytical procedures.

Professor Lamb: kinetics and equilibria in the cobaltammines; the development of the flowing junction in electrometric measurements; studies in electromotive force; the detection and absorption of poisonous gases; the adsorption of gases on charcoal and other adsorbents.

Professor George Shannon Forbes (A.B. 1902): the measurement of oxidation and reduction potentials; quantitative studies of equilibria in solutions of the halogens and their salts; quantitative measurements of photo-chemical reactions; a study of the energy emission of mercury vapor lamps.

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[1] See the second section of this chapter.

Professor Jones: the determination of free energy from electrical potential; the measurement of the conductance, transference numbers, and viscosities of electrolytes; the preparation of fertilizers and baking powders; the prevention of tarnishing of silver; tariff studies in chemical industries.

Dr. Norris F. Hall (A.M. 1915): the electrochemical study of acidity in solutions of acids in organic solvents.

Dr. Albert Sprague Coolidge (A.B. 1915): the adsorption of gases on charcoal.

A gift of $100,000, the income of which may be used to defray the expenses of research, was made to the division in 1917 by Alexis I. DuPont (A.B. 1892).

Beside the normal activities of a vigorous department of a university, certain unusual developments were introduced by the exceptional conditions of the war period. Soon after the entrance of the United States into the World War, Lamb obtained leave of absence in order to assist the scientific staff in Washington. In the American University Experiment Station and later in the Chemical Warfare Service, with the rank of Lieutenant-Colonel, he had charge of the chemical development of protection against poisonous gases to be used in gas masks. Kohler served in the Chemical Warfare Service as a civilian attaché of the War Department. He took charge, as Chief of Offense, of the development of chemical weapons for offensive gas warfare. Richards was a member of the National Research Council, 1916–19, a member of the Committee on Nitrate Supply of the National Academy of Sciences, and Consulting Chemist in the War Department. Henderson developed the use of blood serum as a substitute for gluten, and devised a method for controlling rope, in breadmaking. Grinnell Jones temporarily entered the employ of the Tariff Commission as chemical expert. James B. Conant, commissioned Major in the Chemical Warfare Service, was active in the development of methods for producing necessary organic chemicals. A branch of the Chemical Warfare Service was established at Cambridge, where certain experimental work connected with gas warfare defense was conducted, largely under the direction of Baxter as consulting chemist of the War Department. After the war Lamb continued in Washington in charge of the Fixed Nitrogen Research Laboratory for a year, and for the last ten years he has been Editor of the Journal of the American Chemical Society.

Since the war as before, the Division has been doing its best without waste of effort to give chemistry its proper place in a scheme of general education, and at the same time to develop scientific independence in those specializing in the subject. With new and adequate laboratories and equipment, increased material resources, an energetic staff, and enthusiastic students, the Division looks forward with high hopes to the future.

XVII. PHYSICS

1869–1928

By Edwin H. Hall, LL.D.
Rumford Professor of Physics, Emeritus

THE modern spirit entered the Physics Department unobtrusively in the year 1870 in the person of John Trowbridge, having entered the University a year earlier in the person of President Eliot.

The Physics staff during the year 1869–70 consisted of Joseph Lovering (A.B. 1833), Hollis Professor of Mathematics and Natural Philosophy (also Regent of the University), and George Anthony Hill (A.B. 1865), Tutor in Chemistry and Physics. In Eliot's second year Lovering ceased to be Regent; Hill became Tutor in Physics only; and Trowbridge was brought into the Department as a new force, with the title of Assistant Professor.

Professor Lovering was a man of pronounced characteristics. He prepared his lectures with care and delivered them with good oratorical effect, having an excellent diction and a very solemn manner relieved by occasional gleams of humor.[1] He was remembered by his former pupils with smiling respect, and the public dinner given in his honor at the end of his fifty years' service as a Harvard professor was such a tribute as the community has seldom offered to an academic celebrity.

I doubt whether Professor Lovering ever made an original experiment or any experiment not required for his lectures; but he bought much apparatus for the cabinet, including copies of what European physicists had used in research. I think that his policy was to consult one of the profusely illustrated general textbooks of French origin and buy what he found pictured there. As a young man he had been a student of divinity, and as a college professor he seems to have felt no more called upon to extend the domain of physics than as a preacher he would have felt obliged to add a chapter to the Bible. Naturally conservative, he grew more so with advancing years and with the jostle of progress about him. I once proposed to him, probably about 1884, that we should drop a certain textbook from our list of admission requirements. 'Why?' he asked. 'Because,' I replied, 'it is behind the times.' 'That is just why I like it,' he said. 'Bringing it up to the times means putting in a lot of improper matter.' At another time, referring to the growing interest in electrical engineering, he declared: 'It's only a spurt!'

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[1] One of his pithy sayings was substantially this: 'The reason why the undulatory theory of light is now universally accepted is that the people who formerly believed in the corpuscular theory are all dead.'

Elective laboratory exercises in physics first appeared in the Harvard catalogue of 1871–72. The programme in physics in that year was as follows:[1]

> SOPHOMORE CLASS. REQUIRED STUDIES . . . *Physics.* Ganot's Physics, Books I–IV, *Two hours a week during first half-year.* ASST. PROF. G. A. HILL.
>
> JUNIOR CLASS. REQUIRED STUDIES. *Physics.* 1. Lectures on Mechanics (including Hydrostatics and Hydrodynamics) and on Electricity and Magnetism. *One hour a week.* PROF. LOVERING. 2. Ganot's Physics, Book VI . . . and VII . . . *Two hours a week* (*one recitation and one lecture*) *during the first half-year.* ASST. PROF. TROWBRIDGE. ELECTIVE STUDIES. *Physics.* Herschel's Outlines of Astronomy — Acoustics, 43 *Juniors.* PROF. LOVERING. Experimental Physics, Practical Exercises in the Laboratory, including the use of instruments of precision in testing the laws of Mechanics, Acoustics, Optics, Magnetism and Electricity, 1 *Junior,* 1 *Senior.* ASST. PROF. TROWBRIDGE.
>
> SENIOR CLASS. REQUIRED STUDIES. *Physics.* Lectures on Mechanics, Optics, Acoustics, Electricity and Magnetism. *One hour a week during the first half-year.* PROF. LOVERING. ELECTIVE STUDIES. *Physics.* Undulatory theory of Light, Acoustics, Electricity and Magnetism, in selections from the Treatises by Jackson and Ganot. Lectures. 48 *Seniors.* PROF. LOVERING. Heat (with its applications), 8 *Seniors.* PROF. GIBBS.

Comparison of the numbers in Lovering's and Trowbridge's courses certainly shows no rush of students to the laboratory. However, the laboratory course was open only to those who had elected Sophomore Mathematics, and Junior Mathematics was also recommended. Students of two generations ago were no more eager than their fellows of to-day to fight their way through the difficulties of mathematics in order to grapple with the difficulties of physics.

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[1] Catalogue for 1872–73, pp. 56–60.

In the year 1872–73 Seniors were no longer required to study physics, other requirements in this subject remaining about as before. In this year the laboratory elective offered by Trowbridge included 'an extended course in Electrical Measurements' and was taken by eight Juniors and nine Seniors. The course in Heat offered by Professor Gibbs now required 'some knowledge of the Calculus,' and the number of students taking it had fallen accordingly, the enrolment being two Seniors.

It would not be worth while to trace year by year that process of departmental growth, the beginning of which has been shown by the particulars already given. The process was necessarily gradual and in many respects tentative. Trowbridge, doubtless encouraged and in some respects urged on by President Eliot, was the leading spirit. He had vision, enterprise, and a habit of keeping in sympathetic contact with scientific progress. Moreover, he had an attractive personality and a generous desire to help anyone showing promise of scientific accomplishment. But as a physicist he was mainly self-taught. He had never studied abroad, and physical laboratories for the use of students were unknown in America during his youth. In setting out to build up a system of laboratory instruction, with the necessary foundation of training in general physics and in mathematics, he had little in the way of precedent to follow. Sometimes, no doubt, he undertook the impracticable. Thus in the year 1877–78 he offered, in addition to his time-consuming course on Practical Exercises in the Laboratory, two electives in Mathematical Physics, one of them on Thomson and Tait's Elements of Natural Philosophy, the other on Maxwell's Electricity and Magnetism, these two treatises being profoundly mathematical and proverbially difficult reading. The next year both courses were given up, another, on Conservation of Energy, taking their place.

The results during the first ten years of Trowbridge's efforts to encourage experimental research among his pupils are doubtless shown at their best in certain papers of Benjamin Osgood Peirce (A.B. 1876). The following paragraph, taken with little change from the memoir of Peirce published by the National Academy of Sciences,[1] which I wrote, will give some indication of his remarkable ability and of the opportunities which Harvard furnished during his undergraduate days for its exercise.

[1] *Biographical Memoirs*, vol. viii (1919).

Professor Trowbridge has said that Peirce was his first research student. It was certainly under the influence of Trowbridge that he did the work described in his first research papers, printed in the Proceedings of the American Academy and bearing the date February 9, 1875; that is, the middle of his Junior year in college. It has the title 'On the Induction Spark Produced in Breaking a Galvanic Circuit Between the Poles of a Magnet.' It is about ten pages long and is compactly written. It is, all things considered, a remarkable paper. A year or two before the opening of Johns Hopkins University, it showed a Harvard Junior referring to the work of Becquerel, Rowland, Maxwell, and Thomson, using intelligently and effectively an electromagnet (operated by Grove or, later, Bunsen cells), an induction coil arrangement evidently constructed by himself, a Thomson quadrant electrometer, a Thomson galvanometer in connection with the induction coil and a condenser, and applying the integral calculus handily to his experimental problem. There was not, probably, in all America at that time another college Junior capable of all this; and there are not many such today.

During Peirce's first year as a graduate, 1876–77, he was laboratory assistant to Professor Trowbridge, and in this capacity must have been wonderfully useful, as he was constructive, systematic, and generous. His further connection with the Physics Department, and some indication of the great work he did in helping to shape and strengthen it, will appear in the pages that follow.

Other men of exceptional parts who must have taken laboratory practice in the early years under Trowbridge were Robert Wheeler Willson (A.B. 1873)[1] who was Tutor in Physics from 1875 to 1881, and Harold Whiting (A.B. 1877), of whom more will presently be said.

Together with an expansion of the electives in physics came naturally a reduction of prescribed courses in this subject, and a gravitation of the prescribed courses toward the earlier years of the curriculum. We have seen that in 1871–72 the study of physics was required of all undergraduates except Freshmen. Beginning in 1876 it was required of Freshmen only. At this time, and for several years after, the required work was only in books, although Willson did introduce some voluntary laboratory work in connection with his textbook teaching.

In the year 1879–80 there appeared for the first time a division of the Freshman Class into 'minimum' and 'maximum'

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[1] See Professor Bailey's chapter on Astronomy, below.

JOSEPH LOVERING

BENJAMIN OSGOOD PEIRCE

categories, with respect to the prescribed study of physics. This arrangement had to do with certain physics requirements [1] for admission to College, which had now been put into operation. There was a prescribed offering and an elective offering in the physics for admission. Freshmen who had passed in the prescribed offering only were required to take a course called 'Minimum' Physics; those who had passed in both prescribed and elective offerings were required to take a somewhat different course called 'Maximum' Physics. This 'Maximum' was not very much.

In 1881, the first year of my connection with Harvard, the staff of the Physics Department consisted of Lovering, Wolcott Gibbs,[2] Trowbridge, Harold Whiting, and myself. Whiting was an assistant in the laboratory work of Trowbridge, while carrying on studies for the doctor's degree. As Instructor [3] I taught the prescribed Freshman Physics, and also assisted in Trowbridge's laboratory course. My task was a fairly heavy one, and I cannot flatter myself that I did it well.

At that time the main collection of physics apparatus was kept in Harvard Hall, and there Lovering's lectures and my own were given. Trowbridge's laboratory course was given on the first floor of the Lawrence Scientific School building. Wolcott Gibbs had his private chemical laboratory in the upper story of the wing of the same building and gave his lectures there.

The electric light and the storage battery were then in their commercial infancy and unknown in the quarters of the Physics Department, except as lecture-table exhibits. The calcium light was used with the projecting lantern, and I remember well the feeling of apprehension with which I used to open every new oxygen-filled cylinder, lest it might prove to contain an explosive mixture when the match was applied. Electromagnets were operated by means of bichromate of potash galvanic cells, laboriously set up and combined for every day's use. Our only dynamos were of the portable lecture-room type, driven by hand or by foot-power. The Department had no trained mechanic and no work-shop machinery, except, perhaps, a foot-power lathe. Of course it had no professional glass-blower. Under these conditions experimental research presented difficulties, especially for one who, like myself, had no natural, and very little acquired, mechanical skill.

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[1] There was no admission requirement under the name Physics until 1876. Some public high schools, that of Cambridge being one, were teaching Physics before Harvard mentioned this subject in its requirements for admission. Elementary mechanics, as taught in the Cambridge High School, had been recognized by the College as early as 1871–72 under the heading of Mathematics.

[2] Professor Gibbs, holder of the Rumford Professorship at this time, was a chemist, but he gave one course in physics, on Thermodynamics, and none in chemistry. For the reason of this, see Professor Jackson's chapter on Chemistry, above.

[3] I had taken my bachelor's degree at Bowdoin in 1875 and my doctorate at Johns Hopkins in 1880.

The first work I ever did for Harvard University was to set the admission examination papers in physics for September, 1881, and read the candidates' 'books.' This I did, without any opportunity for consultation with other members of the Department. I remember feeling somewhat surprised that this work should be intrusted to an absolute stranger to Harvard traditions and standards. The incident showed how little importance members of the Department generally attached to the admission requirements, rather than how much confidence they had in me. However that may have been, I was destined to set every physics admission paper to Harvard and read every book written thereon, for several years to come.

The President's Report for the year 1880–81 contains the following announcement:

> Last spring it was made known to the Corporation through Mr. Alexander Agassiz that a friend of the University stood ready to build a physical laboratory at a cost of $115,000, provided that a permanent fund of $75,000 were raised, the income of which should be appropriated to the running expenses of the laboratory. This munificent offer the Corporation were, of course, eager to accept, and they at once set on foot a subscription for the current expense fund, on the procuring of which the principal gift was conditioned. To the present time only $30,000 have been subscribed toward that fund. The offer is still open, but the Corporation, not knowing how long it will remain so, are very anxious to further that subscription.[1]

The principal donor, at first anonymous, was soon known to be T. Jefferson Coolidge (A.B. 1850), a distinguished citizen of Boston who, like his ancestor Thomas Jefferson, had been American Minister to France. It would appear, too, that he resembled President Jefferson in having an intelligent interest in the uses of physical science.

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[1] Trowbridge, though not here mentioned in connection with this proposition, had, I believe, a good deal to do with the initiation of the undertaking and with the work of collecting subscriptions. I have heard him refer with considerable feeling to 'sitting about on people's door-steps' at this time.

The President's Report for 1883–84 states that Mr. Agassiz was 'by far the largest contributor' to the $75,000 maintenance fund, and that he, 'as a committee of the Corporation, had charge of the construction' of the building, which was finished at the end of the year and was named the Jefferson Physical Laboratory. This is described as a 'spacious and well-arranged work-shop, 200 feet long, 50 feet wide and 4 stories high, with rough brick walls within as well as without, and finished throughout in the plainest possible manner; but provided with everything to facilitate physical research which intelligent forethought could plan.'

Certainly this building [1] has proved to be, on the whole, admirably adapted to its purposes, although numerous modifications of its arrangements and conditions have been found advisable in the several decades of its existence, a period in which the developments of physical science have been phenomenal. The 'rough brick walls within' proved to be too severe a measure of plainness; for they made the rooms unconveniently dark, and the mortar, crumbling slightly, strewed the floors with grit. A thick coat of paint soon remedied these evils.

Great pains were taken to exclude iron from the construction and fittings of the western wing, intended especially for research, the galvanometers of that time being subject to disturbance from neighboring magnetic material; so much so that a bunch of keys carried in the pocket of an observer was believed capable of impairing the accuracy of measurements. This western wing now contains tons of iron, since modern apparatus for measuring electric currents is comparatively immune from disturbance due to such material.

Professor Lovering, who as the senior member of the Physics Department was the first Director of the Laboratory, watched with solicitude the transfer of the cabinet apparatus to the new building, this work being intrusted to the unskilled laborers commonly employed about the College Yard. One of these men, an Irishman named George White, attracted Professor Lovering's favorable attention by the care and intelligence he showed in this novel undertaking, and was presently installed as janitor of the Laboratory. He was untaught in any trade and had one mutilated hand, perhaps a reminder of the Civil War, in which he had served; and naturally his appointment to this responsible position was viewed with some misgiving. But George proved to be a treasure. Willing, resourceful, always busy, he was a most uncommon janitor, and he served us admirably for many years, till a habit of drink, inconspicuous for a long time, got a fatal hold on him. His successor, John Connors, coming to us a lad fresh from Ireland but trained for years under George, has been a still greater asset of the Laboratory, loyal and energetic as George, and even more capable.

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[1] It was once struck by lightning, after which experience it was provided with an inconspicuous but apparently effectual protective system of points and conductors. It has more than once been threatened by fire, but now has an automatic sprinkling system which makes the danger from fire rather less than the danger from flood. It was, on May 19, 1922, the scene of an oxygen-cylinder explosion which killed two men and left a permanent grim reminder in the shape of a fragment of the cylinder driven deep into one of the massive wooden beams running across the top of the basement.

Even with the facilities afforded by the new building, which was first occupied in the fall of 1884, the next few years were a period of somewhat tentative effort to devise and coördinate effective courses of instruction and, if possible, to find promising subjects for research and suitable methods of dealing with them. It would be neither pleasing nor profitable to dwell upon the details of this experience.

The Department was greatly strengthened in 1884 by the appointment of Benjamin Osgood Peirce, as Assistant Professor of Mathematics and Physics. After his remarkable undergraduate career Peirce had had the benefit of three years spent in German laboratories, and had been appointed Instructor in 1881. He was a greater scholar than any of the rest of us, a most systematic and careful worker in everything he undertook, and of a most helpful and generous spirit, always eager to do a good turn for a colleague in an unobtrusive way. He took a part of the Laboratory which no one else wanted, and established there a course in Electrical and Magnetic Measurements, constructing everything solidly, both in a material and in an intellectual sense. The same general course, with many changes of detail, occupies the same rooms to-day.

The youngest member of the Department at this time was Harold Whiting. He had an agility of mind and a restless inventiveness that approached genius. He had a passion and a wonderful faculty for doing things in some unusual way, and some of his ingenious devices I was glad to use in lecture-table experiments for many years. But, though personally likeable and generous, he was a difficult colleague to work with, having a remarkable gift of argument in support of any plan that pleased him for the time, but small power of convincing his opponent's reason. Having considerable financial means, he retired from teaching after a few years and made plans for carrying on research in his house on Waterhouse Street, Cambridge. Then he was called to an Associate Professorship of Physics in the University of California. In 1895 he decided to return to the East, and with his wife and their four children left San Francisco in a sailing vessel bound for Panama. A storm broke upon them and the whole family were lost at sea. By a conditional provision of his will Harvard University received from his estate the money that founded the Whiting Fellowships.

Wallace Clement Sabine, who in 1886 came to Harvard from Ohio State University as a graduate student in physics, soon attracted the favorable attention of Trowbridge and in 1889 became an assistant in the work of the Department. The next year he had the main responsibility for an important laboratory course, the so-called Physics C. The laboratory course called Physics B was in my care. For several years a course of illustrated lectures (until 1889 prescribed for Freshmen and called Physics A) was given by various members of the staff; it was not offered after 1893.

Physics B and Physics C had from the start, as they have still, a close connection with the physics requirements for admission to college. Harvard was a pioneer, among American colleges, in the encouragement of laboratory work for pupils in the science courses of preparatory schools; and its influence in this field of education was both great and lasting. The original impulse for this innovation came from two chemists: Professor Josiah Parsons Cooke [1] and his pupil, Charles W. Eliot. A form of admission examination in physics corresponding to the purpose indicated went into effect in 1887. The next year ninety-one candidates offered Elementary Experimental Physics. I personally conducted each boy's laboratory examination one very hot day in Room 41 of the Laboratory with only the help of the assistant janitor, Michael Hillery.

References to existing manuals of physics, for indications as to the character and scope of the preparatory work desired, soon proved unsatisfactory; and it was decided that a pamphlet giving detailed directions for a large number of experiments, regarded as suitable for use in school laboratories, should be furnished by the College. The selection and detailed description of these experiments devolved mainly upon me. The first edition of this Descriptive List, fifty-four pages outlining forty experiments, was published by the University in 1887, and there were six more editions in the next quarter-century. This pamphlet was widely used and exerted a great influence on the teaching of physics in the American schools.[1] Textbooks were written to supplement it. Manufacturers found it worth their while to supply the apparatus recommended by the College; the school teaching of physics came to be a recognized and stable profession, instead of the casual employment of someone whose main interest lay elsewhere; and a summer course for the training of physics teachers was given in the Laboratory. Physics B in the Harvard curriculum was intended for students who had not passed in Elementary Experimental Physics for admission; Physics C for those who had passed in this requirement or could offer its equivalent.

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[1] See Professor Jackson's chapter on Chemistry, above.

Lovering retired in 1888, after holding a full professorship for fifty years, and Trowbridge at once succeeded him as Director of the Laboratory. In the latter's first annual report, he mentioned the acquisition of a Brown and Sharpe milling machine, the gift of Mr. Francis Blake, and urgently stated the need of a fund the income of which would pay the wages of a skilled mechanic to be constantly employed in the workshop of the Laboratory. In 1892–93 we began to have the service of George Thompson, a genuinely skilled workman, a storehouse of information regarding things mechanical, and a man of excellent practical judgment concerning the requirements of apparatus for scientific research. He remained in the service of the laboratory until his death in 1925.

The employment of a mechanic was a good example of the advantages that came to us in consequence of the succession of Trowbridge to the Directorship. Trowbridge had his defects; he was not what William James called 'tough-minded,' and lacked the inexorable quality, so strong in Peirce and in Sabine, needed to make difficult work of research conclusive. But he had keen perception, he saw the capabilities of other men, and was glad to give them opportunity. It was he who discovered Sabine; took him as a helper in research, greatly to the advantage of this work; then brought him into the teaching staff of the Department, greatly to the advantage of our teaching. Trowbridge had vision and constructive imagination. For example, he saw very early that high electric voltages would be needed for research purposes and set up, in the top story of the Laboratory, a storage battery of five thousand test-tube cells (afterwards increased to twenty thousand), constructed by the janitors.[1] Trowbridge never lacked large ideas of something worth undertaking, but his best research work was done in coöperation with younger men.

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[1] When the College Entrance Board in 1909 revised the statement of its requirement in Elementary Physics, the list of experiments which it recommended, without detailed description, was very similar to the list of titles in this Harvard pamphlet. The laboratory examination of candidates was never, so far as I know, required elsewhere than at Harvard; but it was maintained here until 1927, forty-one years in all.

As early as 1890 the courses of instruction offered by the Department had taken pretty definite form and had been fairly coördinated. In addition to Physics B and C, already mentioned, Peirce offered Electrostatics, Electrokinetics, and Parts of Electromagnetism with laboratory work (Physics 3), and Thermodynamics (6); Trowbridge offered Electrodynamics, Magnetism, and Electromagnetism with laboratory work (4), Light, a general treatment of optical phenomena, with laboratory work (5); and I offered General Descriptive Physics (1), Heat-Engines (7), and Dynamos (8), each of these having some laboratory work. The two half-courses last mentioned are notable as the feeble beginning of mechanical and electrical engineering instruction at Harvard. Fortunately for all concerned, the addition of an electrical engineer, Comfort Avery Adams, to the staff of the Lawrence Scientific School in 1891 took the Dynamos off my hands the next year, although I then relieved Peirce of Thermodynamics and continued to struggle two years more with Heat-Engines, when Lionel S. Marks came as Instructor in Mechanical Engineering.

The catalogue offered under courses 'primarily for graduates' in 1891–92 the Mathematical Theory of Electrostatics and Electrokinematics (Physics 9), by Peirce; the Mathematical Theory of Electrodynamics and Electromagnetism (10), by myself; and the '20' courses Spectrum Analysis, by Trowbridge; Problems in Mathematical Physics, by Peirce; Electromagnetism and Heat Conduction, by myself.

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[1] This battery soon came to be in great demand by various research workers, and it was for years a unique equipment of the Laboratory.

Graduate students of physics in the early years of the Laboratory were few, but some who began then and there a lifelong career of devotion to science may well be mentioned here. Arthur Gordon Webster (A.B. 1885), so well known later, remained as an instructor and research student for a year after graduation. Hammond V. Hayes (A.B. 1883), from 1902 to 1907 chief engineer of the American Telephone and Telegraph Company; Austin Lee McRae (S.D. 1886), afterward Director of the Missouri School of Mines; and Alexander George McAdie (A.M. 1885), now Director of the Blue Hill Meteorological Observatory, were graduate students under Trowbridge about 1885. Charles C. Hutchins, on leave of absence from the teaching staff of Bowdoin College, where he was afterward Professor of Physics, an experimenter of remarkable skill, worked very fruitfully with Trowbridge in the year 1886–87. Daniel W. Shea (A.B. 1886), Professor of Physics at the Catholic University of America, and Edgar Buckingham (A.B. 1887), physicist at the Bureau of Standards, remained at Harvard for two years of graduate study. Dr. Samuel Sheldon, who worked with Trowbridge in the year 1888–89 on the neutralization of induction in telephone circuits, became President of the American Institute of Electrical Engineers in 1906. Occasionally a Harvard undergraduate undertook some bit of scientific research in the Jefferson Laboratory. Such a one was William J. A. Bliss (A.B. 1888), who later went to Johns Hopkins and became a permanent member of the physics staff there.

Though Trowbridge's research undertakings were then more numerous than those of any other member of the Department, the rest of us, heavily burdened with teaching, gave at least evidence of an ambition to do something more; proving our possession, in some measure, of that 'fanatical zeal' which, according to a saying of President Eliot, is an essential qualification for the pursuit of original investigation by a college professor. Peirce worked on the properties of galvanic cells, in collaboration with Dr. Robert W. Willson,[1] and attained interesting re-

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[1] Afterward founder and Director of the Students' Astronomical Laboratory. At this time he had no Harvard teaching appointment, but was a most welcome occupant of a room in the Laboratory, being a man of the most genial spirit, great mechanical ingenuity, and willingness to help. See Professor Bailey's chapter on Astronomy, below.

JOHN TROWBRIDGE

WALLACE CLEMENT SABINE

sults. Sabine, as I have already indicated, collaborated with Trowbridge in research during his first years at Harvard, though after a time for several years he devoted himself absolutely to the work of developing his teaching courses and equipping them with suitable apparatus, often of his own design and sometimes of his own construction.

As for myself, in addition to making an occasional excursion into the transverse phenomena of the magnetic field, I undertook to study by a novel experimental method the periodic changes of temperature which occur within the metal of a steam-engine cylinder in action. This work, though crude, attracted some favorable attention, both here and in Europe.

Such was the condition and progress of the Department in its formative period, during the first few years of the life of the Jefferson Laboratory. To treat its subsequent development with detail would be impracticable in the present undertaking.

The life-work of Peirce (1854–1914) and that of Sabine (1868–1919) has been described at some length in biographical memoirs of the National Academy of Science,[1] and a corresponding paper relating to Trowbridge (1843–1923) is in preparation. These three were very different men, but each served his generation to the best of his ability in his own way. Among them Peirce had the broadest and most profound scholarship and the greatest mathematical ability. His research work, always masterly, lay especially in the unexciting fields of magnetism and the thermal conduction of non-metallic substances. Sabine's development of architectural acoustics from a condition of gross and ineffectual empiricism to the status of a reasoned and fairly exact science is probably the most notable single achievement in the history of the Jefferson Laboratory during its first three decades. Trowbridge's service, already indicated in the preceding pages, may perhaps here be appropriately summarized in the following statement, written as the dedication of a certain volume of the Laboratory publications:

> To John Trowbridge, who projected a great physical laboratory for Harvard University and found the means to build and equip it, who by his foresight, invention, and care has kept this laboratory among the foremost in opportunities for scientific achievement, and by his magnanimity has made it a place proverbial for good feeling, this volume is gratefully and affectionately dedicated by those who have profited by his labors and enjoyed his friendship.

[1] Peirce in vol. viii (1919); Sabine in vol. xxi (1927).

The present staff of the Physics Department, highly capable in both teaching and research, is the product of some decades of experience and selection, certain of its members having begun their college careers at Harvard, while others, the majority, have studied as undergraduates in other institutions. Only one, Professor Frederick A. Saunders (PH.D. Johns Hopkins 1898), was appointed here as a teacher (1919) without having been previously a student in the Jefferson Laboratory.

For many years now the research energies of physical laboratories have been directed especially to questions touching the constitution of atoms and the nature, or mechanism, of radiation; and the Harvard Laboratory is no exception to the general rule. The immediate material of such inquiries is furnished by spectroscopy in its various forms and ranges, and nearly all the members of our staff have become widely known because of their researches in this field. Thus Theodore Lyman (A.B. 1897), in addition to serving admirably as Director of the Laboratory since the retirement of Trowbridge in 1910, has measured especially the ultra-violet radiations, subtle phenomena with mysterious potencies; William Duane (A.B. 1893), going farther along the spectrum, has worked especially with X-rays; Saunders has studied broadly the relations of spectral lines. Edwin C. Kemble (A.M. 1914) and John C. Slater (A.M. 1922) have given much attention to the general theory of radiation as based upon the conceptions of Planck, Bohr, Einstein, and others.

Meanwhile radiations of greater wave-length than those of the visible spectrum, radiations which are the vehicle of 'wireless' or 'radio' communication, have become the especial interest and occupation of those members of the Harvard physics staff who are installed in the Crufts Laboratory, an offshoot and neighbor of the Jefferson. Here Professors George Washington Pierce (A.M. 1899), Emory L. Chaffee (A.M. 1908), and Robert F. Field (A.M. 1916), do work of research and application which attracts many students from other American institutions and from foreign countries.

Professor Percy W. Bridgman (A.B. 1904), whose laboratory is in the basement of Jefferson, occupies in various respects a unique position. He is not directly concerned with problems of radiation. He is easily the world's foremost authority on the laboratory applications of high pressure and the behavior of solid and liquid materials under such pressure. He is an extremely prolific experimental investigator and at the same time a profound writer on the philosophical aspects of physics. Sometime the general public may discover him.[1]

Professor Newton H. Black (A.B. 1896) has had the very unusual experience of a college appointment to teach physics after many years of experience as a school teacher of science. As a rule, men appointed to college positions after extended and successful school careers go into the Department of Education, or Pedagogy, there to discourse upon the best ways of teaching some specialty which they have ceased to teach. This custom has its perils, and it is an interesting and hopeful innovation that Black, while giving a part of his time to the School of Education, continues in the active practice of the art of teaching physics. He conducts Physics B, which I built up and managed for a generation; and I cannot help thinking that he is doing this work far better than I did it.

As to my own more recent scientific activities, if they can be called such, these have been directed mainly to the end of forming and formulating a satisfactory theory of electric conduction, heat conduction, and thermo-electric relations in metals.

Within the last fifty years the most fundamental conceptions of physics have been questioned and to some extent modified, but every change has been essentially an advance, rather than a retreat. The practical development and application of physical sciences have kept pace with the progress of reasoned theory, and accordingly great changes in the daily habits of mankind, especially in our habits of communication, have occurred throughout the world. On the whole, all this has been beneficent, broadening the intellectual horizon, staying the scourge of disease, lightening the burden of physical labor, and increasing the ways and means of rational and wholesome enjoyment.

In this era of enlightenment and progress the Harvard Department of Physics has played and continues to play a worthy part.

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[1] A week or two after this sentence was written the Boston *Herald* of December 14, 1928, published a photograph of Bridgman and some of his apparatus, with the heading *Machine That Can Boil Eggs In Ice Water* and a statement that with this machine 'potatoes can be baked at below zero temperature and ice manufactured that is red hot.' The last part of this statement is a reporter's version of the fact that the substance water may under great pressure exist in a solid condition, very different from that of ordinary ice, at temperatures much above that of common freezing. Bridgman proved this a long time ago, about 1910, but it did not occur to him to describe his new product as 'red hot ice,' and so the public mind remained unexcited.

XVIII. ASTRONOMY

1877–1927

By Solon I. Bailey, S.D.
Phillips Professor of Astronomy, Emeritus

1. The Observatory

ASTRONOMY, in Harvard College and University, has followed two distinct lines of development: on the one hand the mathematical and practical, and on the other the observational and astrophysical. The first was established as a part of the original curriculum by President Dunster, and there has probably been no period in the history of the College when an undergraduate could not obtain sufficient knowledge of astronomy to serve the purposes of surveying and navigation. Although Benjamin Peirce (A.B. 1829), Perkins Professor of Astronomy and Mathematics from 1842 to 1880, was the leading mathematical astronomer of his time in America, the teaching of astronomy in Harvard College underwent no remarkable development until the present century: a development described in the second section of the chapter. The observational branch, the study of the nature, positions, and movements of the heavenly bodies, with the object of increasing man's knowledge of the universe, may be said really to have begun with John Winthrop, F.R.S. (A.B. 1732), Hollis Professor of Mathematics and Natural Philosophy. Winthrop, who has been called the first American astronomer, made observations which marked an advance in the knowledge of his day; but after his death such investigations were carried on at Cambridge only intermittently until 1840, when William Cranch Bond was appointed Astronomical Observer for the College, and the Dana House[1] was fitted up as an observatory for him. The Harvard Observatory was founded on its present site in 1844 by a public subscription, filled largely by the merchant shipowners of Boston. The central block of buildings, still standing, was completed in 1851. The Annals of the Astronomical Observatory of Harvard College were begun in 1849, and the same year a bequest of $100,000 was received under the will of Edward Bromfield Phillips (A.B. 1845), which provided for the Director's salary and the running expenses.

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[1] On the corner of Massachusetts Avenue and Quincy Street. Now (1929) the home of Professor George Herbert Palmer.

Under the direction of the Bonds and Winlock,[1] the Harvard Observatory made an honorable record. During this time its work, like that of most of the world's observatories, was largely concerned with the problems of the so-called 'old astronomy,' whose chief aim was the determination of the positions and motions of the celestial bodies. It claimed little or no relation with the newer physical sciences. It is true that observations of the physical features of the members of the solar system had received much attention at Harvard, as elsewhere, and many attempts had been made to unravel their meaning; but, in the absence of modern methods and instruments, knowledge of the true nature of the sun and stars was very limited.

Nevertheless, man's ideas of the universe had been enormously broadened by the world's great thinkers, and especially by the discoveries made known by the telescope. A true conception of the position and relative importance of the Earth and of its relation to the Sun, the other planets, and the stars had been gained. There was no lack, also, of speculations and hypotheses in regard to the structure and development of the Universe, but they were based on insufficient data and could not be accepted with confidence.

The positions and motions of a great number of stars, including the components of many double stars, were well known by 1877. The distances of a few stars had also been determined with reasonable accuracy, but the extension of this difficult investigation to a far greater number of stars was urgently needed.

In general, the progress of modern astronomy has only kept pace with the invention and improvement of its instruments. Without the telescope, the spectroscope, and the photograph, little advance in exact knowledge would have been possible, here or anywhere. The spectroscope, surpassed only by the telescope in its influence on the development of astronomy, had been placed on a safe basis about 1860, through the labors of

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[1] William Cranch Bond (HON. A.M. 1842), Director 1845–59; his son George Phillips Bond (A.B. 1845), Director 1859–65; Joseph Winlock (HON. A.M. 1868) Director 1866–75. See Professor Winlock's account of the Observatory and biographical notice in *The Harvard Book* (1875), i, 303–310.

Bunsen and Kirchhoff, but the observations and conclusions of able investigators between that date and 1877 emphasized the brilliant possibilities.

The art and science of photography in 1877 was ready to take a leading part in astronomical research and to modify profoundly many of its methods, and to displace visual observations in many lines. The photometry of the stars and other celestial bodies, the precise determination of the magnitude, or brightness, is a most important element in astronomical advance. Before that time comparatively little had been done to place the subject on a strictly scientific basis, although the first attempts had been made two thousand years before.

Such was the condition of astronomical science and of the Harvard Observatory in 1876, when President Eliot filled the vacancy caused by the death of Winlock by the appointment of Edward C. Pickering (s.b. 1865), who assumed his duties early in 1877. Pickering belonged to a distinguished family of Essex County, and was born in Boston in 1846. At the age of twenty-two, and three years after his graduation *summa cum laude* from the Lawrence Scientific School, he was appointed Thayer Professor of Physics in the Massachusetts Institute of Technology. There he established the first students' physical laboratory in America, carried on researches of his own, and published two volumes of his Physical Manipulations. As a physicist he was already distinguished; as an astronomer, still an amateur. Eliot's appointment of such a man to direct the destinies of the Harvard Observatory, the 'American Pulkowa,' was severely criticized by astronomers of the old school, but entirely justified. Pickering gave the Observatory new life, and led it during the forty-two years of his directorship to an even higher rank than it had previously enjoyed. Pickering himself soon gained an international reputation, especially for his researches in stellar photometry and spectroscopy, and received nearly all the honors which the world bestows on eminent men of science. He was twice awarded the gold medal of the Royal Astronomical Society. By those who knew him, he is remembered as much for his rare personal charm as for his scientific accomplishments. He was the sort of man under whom it was a privilege to work, and to whom all, amateur or professional, could come with their problems, certain of encouragement and patient consideration. Not merely physics and astronomy but all science was his field of study; music his inspiration; and mountain-climbing an outdoor recreation which shook off the tuberculosis that at one time threatened to cut off his brilliant career.[1]

Before proceeding to describe how the Observatory has taken advantage of the opportunities presented to it, let us mention two other factors in the advance: the scientific staff and the benefactors. The Observatory is a separate Department of the University. Its Director and principal assistants are appointed by the Corporation. The number of such members of the staff has varied from one or two in early years to six or eight in recent years. The Phillips Professorship was founded in 1858 to provide for the Director of the Observatory. Since 1887 the Paine Professorship of Practical Astronomy, then founded under the will of Robert Treat Paine (A.B. 1822), has been devoted to that purpose.

After Pickering's death in 1919 Professor Solon I. Bailey served as Acting Director, until a successor could be found. In 1921 the University was fortunate to obtain the services of a young and able Director, Harlow Shapley, who had been astronomer of the Mount Wilson Observatory for seven years, and who had already begun his brilliant studies in star clusters, the Magellanic Clouds, and the structure and extent of the Galactic system.

Since 1887 the Phillips chair has been used to support the ranking Assistant. Other able assistants have been awarded the title Assistant Professor, Astronomer, or Research Associate. The professors and assistant professors are members of the Faculty of Arts and Sciences, but take no part in teaching, other than research courses. In addition to the above, which are Corporation appointments, as many as thirty assistants, according to the needs and income of the Observatory, have been added to the staff by the Director. Many of these have been women, a few of whom have done work of the highest value, but whose position has seldom been recognized officially. Mrs. Williamina P. Fleming, assistant 1881–1901, made many interesting discoveries by an examination of photographic plates, and took a prominent part with Miss Antonia C. de P. P. Maury in the development of the spectral classification of stars; Miss Annie J. Cannon, who succeeded Mrs. Fleming as Curator of Astronomical Photographs, has received international recognition for the part she has taken in the spectral classification of the Henry Draper Memorial; and Miss Cecilia H. Payne (PH.D. Radcliffe 1925) is already a leader in the astrophysical branch of astronomy.[1]

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[1] See memoirs by S. I. Bailey in *Astrophysical Journal*, i (1919), 233–244, and by J. H. Metcalf in *Proceedings of the American Academy of Arts and Sciences*, lvii (1922), 502–506. Pickering was the founder and first president of the Appalachian Mountain Club.

Equally important has been the coöperation of men and women of wealth, who have rallied to the aid of astronomical research. The Harvard Observatory was founded, and has been maintained for the most part, by gifts; its present great development is due to the idealism of its benefactors. Without them it could have made small advance.

To Pickering, when he came to the Observatory in 1877, the accumulation of facts appeared to be of vastly greater importance than further attempts at theory; and to this task he dedicated his life. He first gave his attention chiefly to the photometry of the members of the solar system and of the stars. This work could be undertaken with the fifteen-inch telescope, as soon as suitable photometers were devised and constructed. Several such instruments were made varying considerably in detail but constructed on the principle of the equalization of the light of two comparable stellar images by means of a Nicol and polarized light.

During the first few years, Pickering, aided by Searle, Waldo, and Wendell,[2] measured the magnitude, or brightness, of the planets and satellites, asteroids, and the components of double stars. An especially interesting problem presented itself in the recently discovered small satellites of Mars. By ingenious devices, the light of these extremely faint and difficult objects was measured. Many years later, the photographic magnitudes and color indices of many of these objects were measured by King.[1] In these early years, also, was begun the determination of the exact times of the eclipses of Jupiter's satellites by photometric measurements, thus obtaining more precise results than could be obtained by ordinary methods of observation. These observations were continued by Pickering and Wendell for more than thirty years.

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[1] The presence of these women assistants appears to have afforded the compilers of the university catalogues considerable embarrassment. Mrs. Fleming, an assistant since 1881, first appears in the annual catalogue for 1899–1900. She remained the only woman officer of the University until 1906–07, when one of her colleagues made a surprising appearance as Selina Cranch Bond, *Emeritus* (corrected *Emerita* in 1907–08). Neither, however, appears in the Quinquennial. Miss Annie J. Cannon, an assistant since 1896, first appeared in the annual catalogue for 1925–26, shortly following the bestowal of a D.Sc. by the University of Oxford. S. E. M.

[2] Arthur Searle (A.B. 1856), who succeeded to the Phillips chair in 1887 (his successor being the present writer); Leonard Waldo (S.D. 1879), Assistant in the Observatory 1876–80; and Oliver C. Wendell, Assistant Professor of Astronomy, 1898–1912.

Until recent years, the astronomy of position, especially observations with the meridian circle of the right ascension and declination of stars, received continuous attention at the Observatory. This work was in charge of Rogers,[2] for many years and later of Searle. Two zones of stars, forming a part of the international scheme of the Astronomische Gesellschaft, were observed, the results of which fill several volumes of the Annals.

Pickering's chief interest at that time was in a complete photometry of the stars, and a photometric survey of the whole sky. He soon began the construction of a small meridian photometer for the determination of the magnitudes of all the brighter stars on an absolute scale and with a definite zero. Thus originated the Harvard Photometry, which in time was extended to much fainter stars, a work which has received international recognition. In its execution various members of the staff took part. In all, the brightness of many thousands of stars was measured, depending upon about two million estimates. The extension of this investigation to extremely faint stars by visual methods became unnecessary, later, by the introduction of photographic photometry, which offered a means for extending the scale of magnitudes to stars much fainter than could be reached by visible observations.

A work of high value was the selection of a Standard Polar Sequence and the determination of the magnitudes, both visual and photographic, from the brightest stars in the region to the faintest stars shown on photographs of long exposure. An idea of the wide range of the problem is gained by a consideration of the fact that the light of a hundred million stars of the twentieth magnitude is required to equal that of one star of zero magnitude, such as Alpha Lyrae, Vega. The scale of this Polar sequence could then be transferred to other sequences of stars distributed over the northern sky, and, indirectly, to similar sequences in the southern sky. Magnitudes were thus found for sequences of stars in the Harvard Standard Regions, into which the whole sky was divided by Pickering, and in the Selected Areas of Kapteyn. Needed magnitudes of stars in any part of the sky can thus be referred to the stars of one of these secondary standard sequences, and hence the same absolute scale of magnitudes is everywhere preserved.

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[1] Edward S. King (A.B. Hamilton 1887), Assistant Professor 1913–26, Phillips Professor since 1926.

[2] William A. Rogers, F.R.S., Assistant in the Observatory 1870–86, Assistant Professor 1877–86.

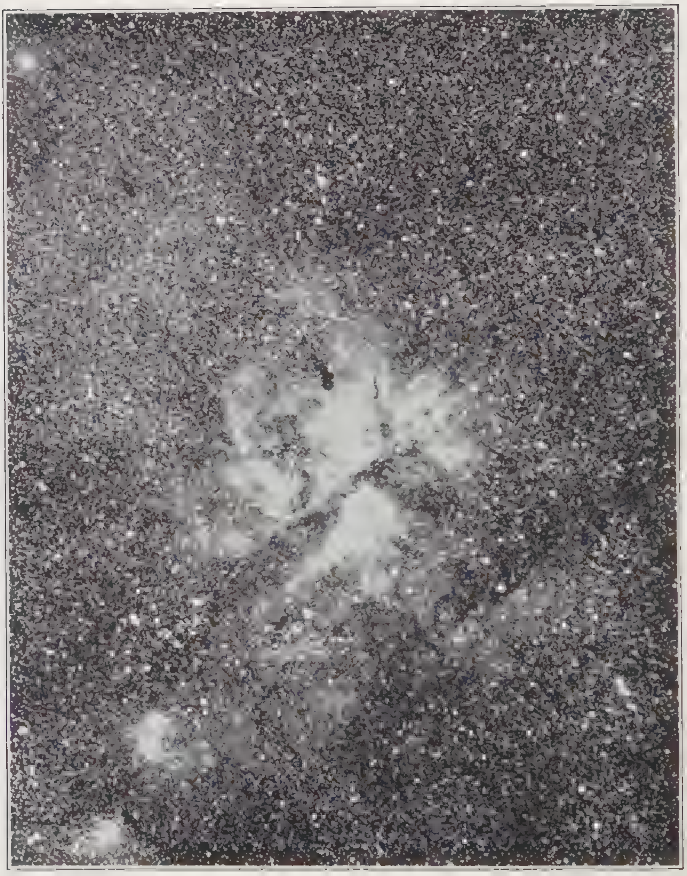
For placing the photographic magnitudes on an absolute, independent scale, much has been due to the investigations of King. In his work, all the results were derived from photographic plates of the stars, using out-of-focus images. The scale of photographic magnitudes was entirely independent, but the zero of the scale was arbitrarily fixed in convenient accordance with the visual photometric scale.

The part which the Observatory has taken in the development of stellar spectroscopy has been of equal or greater importance than that in photometry. As stated above, a beginning had been made elsewhere. Greatly increased opportunities came with the introduction of photographic methods. Beginning his investigations in 1882, the Director, assisted by his brother, William H. Pickering, took up the photography of the stars, using the doublet, instead of the usual form of astronomical telescope, and the objective prism, instead of the slit spectroscope. For intensive work the slit spectroscope offered many advantages, but for extensive surveys of the whole sky as planned by Pickering, the objective prism placed in front of a doublet had no equal.

An adequate endowment for this research was provided by Mrs. Henry Draper, of New York, in memory of her husband, an accomplished amateur astronomer. In 1882 she established a Department of Stellar Spectroscopy at the Observatory, supported it during her life, and endowed it at her death. On this account the investigations became known as the Henry Draper Memorial, and the extensive catalogues of stellar spectra published by the Observatory bear Draper's name.

As in photometry, the programme was arranged to cover all available stars in the whole sky. It included the classification of all stars to as faint magnitudes as possible with moderate precision, as well as a study of the spectra of bright stars in much

EDWARD C. PICKERING



GREAT NEBULA AND STARS NEAR ETA CARINAE
IN THE MILKY WAY

A four-hour exposure made with the Bruce photographic telescope at the Harvard Observatory in Arequipa greater detail. A single photographic plate with long exposure sometimes showed the spectra of hundreds of stars with sufficient detail to permit their classification. On the other hand, with a large telescope of long focus only a single star might be shown on a plate, but in some cases revealing hundreds of spectral lines.

The principles now universally accepted for the classification of stellar spectra were in large part a development of the work of this Observatory. The first catalogue of stellar spectra, prepared by Pickering and Mrs. Fleming, contained 10,351 stars. This was followed by a more detailed study of the spectra of bright northern stars, by Miss Maury, and of bright southern stars, by Miss Cannon. Later appeared the largest and most important catalogue of stellar spectra issued by the Observatory. It is known as the Henry Draper Catalogue of Stellar Spectra. The number of stars whose spectral classification is given is 225,000, distributed over the whole sky and including stars to about the ninth magnitude. The classifications were all made by Miss Cannon. This catalogue fills nine volumes of the Annals. An extension of this catalogue to still fainter stars has been undertaken by Miss Cannon at the request of Dr. Shapley. Other important contributions, in the field of spectral analysis, have been made by Dr. Cecilia H. Payne. In her volume Stellar Atmospheres, published as Harvard Observatory Monograph, No. 1 (1925), Miss Payne has deduced values of the temperatures of the stars, the proportions of the various chemical elements in stellar atmospheres, and the application of the modern atomic theories to astronomical physics, and several factors significant in the analysis of the structure of the atmospheric layers of stellar bodies.

The discovery and study of variable stars during the last fifty years at the Harvard Observatory have brought notable results. In 1877, less than two hundred such stars were known. By the end of 1927, more than five thousand had been announced, of which more than four thousand were found at Cambridge.

Elaborate studies of many of these variables have been carried forward by photometric methods, by Wendell and others at the Observatory; and an immense number of comparisons of their changing light has been made for the determination of their periods and ranges of variation. These observations have been made not only by members of the Observatory, notably

Mr. Leon Campbell, but also by a large group of amateur astronomers, who form the society known as the American Association of Variable Star Observers, which is closely affiliated with the Harvard Observatory.

Variable stars are found almost everywhere in the sky but very unequally distributed. An interesting discovery was the presence of large numbers of variables in certain globular star clusters. The Magellanic Clouds, also, were found to be rich in variables. From a study of these, Miss Henrietta S. Leavitt formulated the law for Cepheid variables, that a definite relation exists between the absolute magnitudes and the periods, a law whose application was made universal by Shapley, and a measuring rod for celestial distances.

The so-called new stars, or better temporary stars, form a division of the variable stars. Of the fifty new stars now known outside the spiral nebulae, a large proportion was discovered at Harvard. From Bailey's photographic study of the subject, it appears that, on the average, one, or perhaps two, novae occur each year of the sixth magnitude and brighter; and ten, or possibly twenty of the ninth magnitude and brighter. Only the brightest of these are observed.

Reference has been made to the influence of photography in astronomical research. Pickering was prompt to take advantage of the perfection of the dry plate, especially in spectroscopic investigations. At first, photometry was almost altogether visual, but now it is chiefly photographic. The miscellaneous results obtained during the photographic surveys referred to above have been unprecedented, and include the discovery of many novae, variable stars, asteroids, satellites, and nebulae. Altogether, several thousand new and interesting objects have been found.

During many years King has made valuable contributions to a better understanding of the complicated processes involved in celestial photography.

The various scientific expeditions and foreign stations of the Observatory have been important features of its activities. Beginning with the eclipse of 1851, total eclipses of the Sun have been observed in different parts of the world, the latest that of January 4, 1925.[1] From the observations thus obtained, considerable advance has been made in our knowledge of the Sun.

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[1] Other eclipses have been observed by the Laboratory. See below, p. 305.

Of greater importance have been the foreign stations occupied during the last forty years for the purpose of finding the world's most favorable climate for astronomical observations, and for extending the various stellar investigations to the southern sky.

The Boyden Fund for carrying on astronomical observations in the best possible location was received in 1887. A liberal programme was promptly prepared in order to carry out the wishes of the donor, Uriah A. Boyden of Boston. An investigation of the climate of various localities was made, especially of the elevated regions of Colorado. A temporary station was maintained during 1889–90 on the summit of Mount Wilson, in Southern California, a site occupied later by the Mount Wilson Observatory of the Carnegie Institution. Finally, it was decided to combine in a single station the advantages of an elevated site and a position in the southern hemisphere. The place selected was two miles north of the city of Arequipa, Peru, at an elevation of 8,000 feet.

The Arequipa Station was maintained from 1891 to 1927, when it was removed to South Africa. Much and valuable work had been accomplished in Peru. In many ways the conditions at Arequipa were admirable, and the government and people were most hospitable. The cloudy season, however, proved to be unexpectedly long and severe. Attempts were made to find a more desirable site in some adjacent region. An expedition had also been sent in 1908 to test the climate of the elevated plateau of South Africa. The results appeared to be fairly satisfactory, but no change was possible until recently, when Dr. Shapley, the present Director, obtained ample funds for that purpose. In 1927, the southern station of the Observatory, officially known as the Boyden Station, was transferred to Mazelspoort, about fourteen miles northeast of Bloemfontein, at an elevation of about 4,500 feet. The government of Bloemfontein has made a liberal appropriation to assist in the establishment of the Station. At this new site a powerful equipment is being installed, well fitted to carry on the investigations which have been planned.

In 1900 an expedition was sent by the Observatory in charge of Professor W. H. Pickering to Mandeville, Jamaica, equipped with a twelve-inch telescope having a focal length of 135 feet. This telescope proved to have no apparent advantage over those of the usual proportions, but during the year the expedition remained in Jamaica, it was used to gather data for Professor Pickering's Atlas of the Moon.[1] The Mandeville station was reëstablished by Professor Pickering as one of the Observatory's regular Boyden stations in 1911. With an eleven-inch Draper telescope significant lunar and planetary observations were made. After the retirement of Professor Pickering in 1924 he continued the Mandeville station as his private observatory, though without the Draper telescope.

For many years the Blue Hill Meteorological Observatory[2] was closely associated with the Astronomical Observatory, and the results of the observations there made fill several volumes of the Annals. In connection with the Arequipa Station, a chain of secondary meteorological stations was maintained for many years, extending from Mollendo on the Pacific Ocean to Santa Ana beyond the Eastern Andes. These culminated in a station placed on the summit of the nearly extinct volcano El Misti, at an elevation of over 19,000 feet. The records obtained at these stations have been of service to meteorologists.

Pickering began his duties as Director with four assistants. In 1927, more than thirty investigators and assistants were engaged in the work of the Observatory. The results obtained are published in the Annals, now consisting of nearly a hundred volumes, and in bulletins, circulars, and reprints. Announcement cards and telegrams give notice of important astronomical events to the astronomers of all countries.

A large increase in the instrumental equipment was required to carry out the various researches undertaken during the last half century. In 1877, the Observatory had two important instruments; by 1927, it had acquired nineteen telescopes, visual and photographic, of diameters from eight to sixty inches, with several smaller ones, and a variety of photometric and spectroscopic apparatus. The unrivaled collection of celestial photographs, consisting of more than 200,000 glass plates, is one example of the work accomplished. These photographs form a history of the sky during the last forty years. The last instrument to be added to the equipment is a sixty-inch reflecting telescope, which will be sent to the Boyden Station in South Africa.

The need of this powerful telescope and the nature of the past and the present work of the Observatory were well stated by Shapley in his Annual Report for 1926–27:

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[1] *Annals of the Harvard Observatory*, vol. li.

[2] See Professor McAdie's chapter in this volume.

> The Harvard Observatory has carried on fundamental surveying work on the southern skies for thirty years, attacking problems in a comprehensive manner, but seldom analytically. For example, the visual brightness, spectral classification, and variations in light have been studied for thousands of stars; a score of new stars have been found on plates made at the Boyden Station; some ten thousand new nebulae have been discovered; and surveys of double stars, star clouds, gaseous nebulae, and star clusters have been products of the systematic work with the several photographic refractors. But searching analyses of special objects such as the Magellanic Clouds, globulae clusters, gaseous nebulae, and individual stars have generally been impossible. The rapid photographic refractors and patrol cameras are suitable for the fundamental work and their use will be continued unabated, but a large well-equipped reflecting telescope is necessary for the special analytical studies.

Shortly after Shapley became director, an annual series of open nights for the public was inaugurated at the Observatory. Owing to limited space, admission is granted without charge only to those who procure tickets in advance. The open nights are regularly overcrowded. When weather prohibits observation, an illustrated lecture and a general inspection of the Observatory is substituted for stargazing. The management of the open nights has been taken over since 1926 by the Bond Astronomical Club, an organization of amateurs and professionals centered in the Observatory.[1]

2. THE TEACHING OF ASTRONOMY AND THE ASTRONOMICAL LABORATORY[2]

Astronomy, as we have seen, has been taught in Harvard College since the beginning, but not as an important feature until comparatively recent times. Although the Observatory offered to receive advanced students and even outlined a course of study in the catalogue, few came; since the College gave no credit for such work nor indeed any opportunity to prepare for it. As late as 1890–91 Harvard College offered no course devoted to astronomy alone, and only one that included it: Applications of Spherical Trigonometry to Astronomy and Navigation (Mathematics 1). In 1928–29, six courses were offered devoted exclusively to astronomy, in addition to four research courses.

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[1] The Club has instituted a series of 'open Friday nights' for the advanced classes of the public and private schools of Cambridge and vicinity. These, too, are largely attended — some twelve hundred students and teachers coming each year to the Observatory for a short illustrated lecture followed by demonstrations of apparatus and telescopic observing.

[2] Professor H. T. Stetson has kindly furnished the material for this section.

The beginning of this improved interest in the teaching of astronomy was due in large part to Robert W. Willson (A.B. 1873). His inspiration to study astronomy came from the maritime traditions of his native place, Salem, the home of Nathaniel Bowditch and ancestral home of the Pickerings. Appointed Instructor in Astronomy in 1891, Willson immediately offered, in the Engineering Department, a course on Practical Astronomy 'intended primarily for the use of students of Engineering,' and added in 1894 a course on Descriptive Astronomy 'intended primarily for students of Civil Engineering, but it may be taken by others.' By 1897 his astronomy courses had broken away from the Department of Engineering, and were in a section by themselves under the Department of Physics.

Willson envisaged the introduction of laboratory methods in the teaching of astronomy, similar to those already in use for physics and chemistry. Opportunity came with his appointment as Professor of Astronomy in 1903. Obtaining the use of a frame building on Jarvis Street, which had already served several departments of the University on three different sites,[1] he remodelled it, largely at his own expense, as a Students' Observatory and Astronomical Laboratory, and equipped it with telescopes, nautical instruments, and apparatus for teaching astronomy. Willson was a genius at designing such apparatus, which was constructed in a machine shop attached to the laboratory. His example, and the facilities he created, led to the establishment of astronomical laboratories elsewhere, and to-day thousands of pieces of apparatus of his designing are to be found in classrooms and laboratories, the world around.

Although primarily interested in students who specialized in astronomy, Professor Willson never neglected the larger group who wanted but one survey course, and whose only glimpse of the scientific habit of thinking would come through that course.

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[1] Temporary Agassiz Museum, 'Zoölogy Hall,' College hospital, Hasty Pudding Club, and Architectural Department.

Much of his energy and talent was employed in devising apparatus to demonstrate clearly the more puzzling aspects of his subject. Astronomy 1 became one of the most popular scientific courses in the College, and Professor Willson, the Shaler (as it were) of his subject. His course on Navigation and Nautical Astronomy (Astronomy 2a) was so successful that during the World War the first Shipping Board School of Navigation was established there; and when that moved to larger quarters, instruction in Navigation was given to almost five hundred students in the College. The interest thus engendered continued after the war, and, in connection with the excellent equipment of the Students' Astronomical Laboratory, resulted in Harvard's being selected by the Navy Department as a Naval Science Unit, in 1927.[1]

Beside its strictly pedagogical function, the Laboratory has offered facilities for independent research by graduate students and members of the Department; and many results of these investigations have been published in the Astrophysical Journal, the Publications of the American Astronomical Society, and elsewhere. Its chief contributions to astronomy have been in photometry, observations of occultations, the systematic measurements of radio reception as a concomitant factor in sunspot variation, and researches on the solar corona. For the latter purpose the Laboratory has conducted four eclipse expeditions: in 1923 to Lakeside, California; in 1925 to Middletown, Connecticut; in 1926 to Benkolen, Sumatra; and in 1927 to Norway.

The leader of these expeditions was Professor Harlan T. Stetson, who came to Harvard as instructor in 1916, the year after taking his doctor's degree at Chicago. Stetson succeeded Willson in charge of the Astronomical Laboratory in 1919, and has since conducted his courses.

Astronomy became a field for the A.B. with honors, and for the Ph.D. in 1921. Under Stetson in the College, and Shapley at the Observatory, certain branches of advanced work in the Laboratory and the Observatory became affiliated. The assistants at the Laboratory have with few exceptions been candidates for higher degrees in the Graduate School, and the Director and members of the Observatory staff offer '20' courses on their special fields of astronomical research. Thus the Laboratory has been an important feeder to the astronomical profession. More than four thousand students have been enrolled in courses at the Laboratory during the quarter-century of its existence; and hundreds of its graduates are to be found in various parts of the world, as teachers, assistants in observatories, or applying the knowledge of astronomy learned here to the exploration of little-known regions of the globe.[1]

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[1] Professor Willson retired in 1919, and died in 1922. His widow, in order to ensure the perpetuation of his work, endowed a chair of Applied Astronomy in his name, and his three surviving sisters have established a Robert Wheeler Willson Memorial Scholarship Fund.

It may be seen, therefore, that both Observatory and College have been prompt to take advantage of the exceptional opportunities for the development of astronomy, which the last half-century has presented. The present, also, is full of possibilities, the fulfilment of which is in capable hands.

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[1] Many men distinguished in astronomical research in other institutions have been, for a longer or shorter period, members of the Observatory or College, either as associates, investigators, or students. Among them are Benjamin Apthorp Gould (A.B. 1844), Asaph Hall (HON. A.M. 1879), Simon Newcomb (S.B. 1858), J. C. Kapteyn (HON. S.D. 1909), Ralph A. Sampson, George E. Hale (HON. S.D. 1921), Henry N. Russell, Benjamin Boss (A.B. 1901), C. A. Chant (PH.D. 1901), Herbert Couper Wilson, Ejnar Hertzsprung, and Boris P. Gerasimovič.

ROBERT W. WILLSON

SHAPLEY BIRKHOFF BRIDGMAN

THREE HARVARD SCIENTISTS

XIX. GEOLOGY AND GEOGRAPHY[1]

1858–1928

By William Morris Davis, S.D.
Sturgis-Hooper Professor of Geology, Emeritus

AND

Reginald Aldworth Daly, S.D.
Sturgis-Hooper Professor of Geology

1. Whitney and Shaler

IN 1875, when Louis Agassiz ceased lecturing on geology, instruction in that science at Harvard was continued by Josiah Dwight Whitney and Nathaniel Southgate Shaler.

Whitney[2] graduated at Yale College in 1839, heard Lyell's lectures on geology in Boston in 1841, and made two visits to Europe between 1842 and 1847 for the study of chemistry, mineralogy, and geology. He had varied field experience on geological surveys in New Hampshire (1840), the Lake Superior district (1849), Iowa, Wisconsin, and Illinois (1855), made a tour of the Southern States (1853), and was chosen one of the fifty original members of the National Academy of Sciences (1863). He was short of stature, with a high-pitched voice, yet of dignified presence, and in his later years strikingly handsome with massive head and gray hair and beard. Although in his early maturity Whitney had consorted with radicals, he was conservative in temperament. Although kindly at heart, he was brusque in manner, especially with strangers, and combative in disposition. Of studious habits, he was inclined to facetiousness in familiar intercourse, and he was a man of many talents: a linguist like his younger brother, William Dwight Whitney, the famous philologist of Yale, in his youth a performer on eight different musical instruments, and skilful enough with his pencil to prepare excellent illustrations for his geological reports.

In the course of his necessarily roving existence Whitney spent the spring of 1845 as a resident graduate at Harvard, which he described as 'the greatest University in all creation.' Five years later he established a private geological laboratory near Boston, a city of 'much more refined and literary society than New York,' and indeed at that time 'the only city where anything of any account is done for science.' He even hoped that his philosophical brother William might obtain a professorship at Harvard, where 'there is so much more liberality of religious opinion.' He was again in Cambridge over the winter of 1853–54, as one of a brilliant bachelor household, whence emanated from the fertile brain of a professor of Latin, the famous 'Lay of the Lone Fishball.' At this time Whitney wrote his Metallic Wealth of the United States, after having 'travelled over 20,000 miles in twenty-five different states' in preparation for it. This work at once gave him high standing in scientific circles.

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[1] Courses on Geology and Geography were included with those on Botany and Zoölogy in the Department of Natural History until 1890, and were not called Geology 1, 4, etc., until 1886.

[2] E. T. Brewster, *Life and Letters of Josiah Dwight Whitney* (1909).

It was as the most highly trained and most widely experienced American geologist of his day that he was appointed State Geologist of California in 1860, a position for which he was recommended by Agassiz as the 'one man in the United States fully qualified.' With the added luster of his work in California he was selected in 1865 to conduct the new School of Mining and Practical Geology at Harvard, but his teaching did not begin there until three years later, when he was in his fiftieth year. For several years after 1868, Whitney's duties in California led him to make many journeys across the continent. This distraction led to his chief contribution to field work for his students. Accompanied by several experts and by the four students of the first class enrolled in the School of Mining, he conducted an expedition to Colorado in the summer of 1869, with the object of determining whether any of the Rocky Mountain peaks reached their reputed altitude of 18,000 feet. All were found to be lower than 14,500 feet, thus showing that the highest mountain in the United States was the summit in the Sierra Nevada of California, to which Whitney's assistants had, by right of discovery, given his name in 1864. A year earlier Whitney himself had bestowed upon a peak which he then thought was the highest unnamed mountain in the Sierras, and from which he had enjoyed 'the finest mountain view in the United States,' the honored name of Dana. During the stay of the summer party in Colorado, little geological instruction was given to the student members by their leader, for he was engrossed in mapping and measuring the mountains, the two highest of which were named Harvard and Yale; but students gained much valuable experience in topographical surveying under an excellent teacher.

In the years 1866–69 Whitney secured for the Faculty of the School of Mining three specialists: Raphael Pumpelly,[1] Thomas Messenger Drown,[2] and William H. Pettee (A.B. 1861),[3] from whom the student body of nine received excellent teaching. The faculty of the school included also professors already on duty at Harvard College and the Lawrence Scientific School, such as Shaler, Gray, and Gibbs. Yet in spite of the appetizing list of names on the Faculty of the School of Mining with Whitney at the head, and in spite of the great opportunity at that time for trained men in the development of mines in the Far West, the School attained no success. Whatever the reason, it did not thrive. The student body declined to zero in 1874, and the School disappeared from the catalogue in 1875.[4] Whitney thereafter continued his work as Sturgis-Hooper Professor of Geology. That chair is a research professorship, with freedom to teach as little and to study and travel as much as the incumbent desires. Unfortunately the Sturgis-Hooper fund yielded only a trifling sum for the expenses of research and travel in supplement to the professor's specified salary; perhaps for this reason no considerable field studies were undertaken by Whitney.

Curiously enough, after Whitney received his enviable appointment as Sturgis-Hooper Professor, he became less associated with the Lawrence Scientific School than with the Museum of Comparative Zoölogy, to the faculty of which he was added, and to the library of which he agreed to leave his valuable collection of geological books on his death, in return for being assured of the professorship for life. Presumably in part for this external reason, but also undoubtedly because of his lack of interest in undergraduate affairs, Whitney thereafter took little part in University matters, and rarely attended meetings of the College Faculty. Whitney's lectures, chiefly on geographical exploration, economic geology, and ore deposits, were of advanced grade; and for that reason were never largely attended. He gave great care to their preparation.

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[1] Professor of Mining, 1886–75. See Rollo W. Brown, *Lonely Americans* (1929).

[2] M.D. Univ. Pa. 1862; Instructor in Metallurgy, 1869–71, later Professor of Chemistry at the Massachusetts Institute of Technology, and President of Lehigh University.

[3] Instructor in Mining, 1869–71; later Professor of Mining Engineering at the University of Michigan.

[4] See Dean Hughes's chapter (below) on the Harvard Engineering School; its successive professors of Mining Geology, Henry Lloyd Smyth, Louis C. Graton, and Donald H. McLaughlin, able teachers and investigators, have been of the most vital importance to the Department of Geology.

By reason of his close association with the Museum of Comparative Zoölogy, Whitney's most important studies appeared in the Museum publications. The first of these, on the auriferous gravels of the Sierra Nevada of California (1880), prepared in conjunction with W. H. Pettee, was a continuation of work begun years before in that western state, and embodied the results of a large amount of field observation. Another of his studies concerned the famous Calaveras skull, in the veritable antiquity of which he firmly believed, although its genuineness has been discredited by all later investigators. A third study, the Climatic Changes of Later Geological Times (1882) was in large measure a protest against what the author took to be the exaggeration of the then actively growing glacial theory. A fourth study, undertaken in connection with M. E. Wadsworth, was on the Azoic system of the Lake Superior region. A final task was the definition of geological terms in the Century Dictionary, which was under the editorship of Whitney's brother at Yale. Whitney remained active in library investigations until his death in 1896.

Between 1875 and 1877 Marshman Edward Wadsworth (A.M. 1874) was associated with Whitney as Instructor in Mathematics and Mineralogy. His teaching was accurate and thorough, and it included recognition of the derivation of certain metamorphic rocks from ancient lavas, a possibility that was then not so generally accepted as it is now. When Wadsworth was called to a professorship elsewhere,[1] the teaching of this subject was given to John Eliot Wolff (A.B. 1879).[2]

Nathaniel Southgate Shaler[3] was born in Newport, Kentucky, in 1841, the descendant on his father's side of adventurous New England sea-captains, and, on his mother's, of a noted

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[1] Later he was Professor of Mining and Dean both of the Pennsylvania State College and the University of Pittsburgh.

[2] See Professor Palache's chapter on Mineralogy, below.

[3] His *Autobiography* (1909) is a classic in autobiographical literature; see also John E. Wolff's 'Memoir' in *Bulletin of the Geological Society of America*, xviii, 592–608.

Virginia family among the early pioneers of Kentucky. The characteristic virtues of both stocks were united in him; and his early life, though devoid of systematic training, was passed in an environment that gave him abundant contest with unspoiled human nature, as well as with the cultivated circle to which his parents belonged. He learned to deal with all manner of human beings, to defend himself with fist, rapier, and rifle; and he acquired an insatiable curiosity for the secrets of nature. In 1858 his father, a Harvard graduate of the class of 1827, sent him to Cambridge to prepare for admission to College. Fortunately he rebelled against the detestable rules of scanning which his tutor set him to learn, gave up a course where he would have been lost to science, and enrolled himself in the Lawrence Scientific School. In company with other enthusiasts of whom he was almost the youngest, he studied under the master, Louis Agassiz. Shaler's purpose was to gain a foundation of natural history and special knowledge of geology. Although possessed of ample means and high spirits, a leader in college pranks and fights, he worked hard and successfully.

Agassiz set him as a first lesson, the unguided study of a bad-smelling fish for two weeks. He survived the ordeal so well that he was soon advanced to the study of the Brachiopoda, 'the best group of fossils to serve as data in determining the Paleozoic horizons.' He had an immediate and enduring affection for his master, who stimulated his enthusiasm and gave him an inquiring motive. The two became so intimately associated that the pupil received most of his instruction from bits of the master's talks. Much profit came also from debates with classmates such as Alpheus Hyatt,[1] Frederic W. Putnam,[2] A. E. Verrill,[3] and William Stimpson, who roomed in old Zoölogy Hall,[4] and formed a local zoölogical club; as well as from the meetings of the Boston Society of Natural History, then attended by a remarkable group of men of science, such as Gray, Agassiz, William B. Rogers, William Cranch Bond, Charles T. Jackson, Jeffries Wyman, Benjamin Peirce, and Benjamin Apthorp Gould. There the particular aim of the young men was to set Agassiz and Rogers by the ears; for they were chronic enemies in that period when the glacial theory and evolution were fighting issues everywhere. The Harvard Faculty was divided into two hostile camps: the anti-Darwinians led by Agassiz and Francis Bowen, the Darwinians by Gray and Wyman. So strong was the antagonism that the pupils of one man feared to be seen in parley with the enemy. For this reason, not until Shaler became a teacher and, like practically all of Agassiz's students, accepted evolution, did he make close acquaintance with Gray.

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[1] Professor of Zoölogy and Biology at the Massachusetts Institute of Technology and Boston University.

[2] Peabody Professor of American Archaeology, and Professor of Anthropology in the University of California.

[3] Professor of Zoölogy at Yale.

[4] The thrice-moved and frequently altered building which is now the Astronomical Laboratory.

Shaler spent the summer of 1860 with Hyatt and Stimpson dredging along the coast of Maine; and in 1861 made with Hyatt and Verrill an adventurous three-months' expedition in a schooner to the island of Anticosti, to gather fossils, of which a large collection was brought back. After a five-hour oral examination by President Felton, and Professors Agassiz, Wyman, Gray, Peirce, Cooke, Lovering, and Horsford, he was granted the bachelor's degree *summa cum laude* in 1862, promptly returned to Kentucky to raise a battery of artillery for the Union cause, and served as its captain for almost two years, when his health broke down. Returning to Cambridge, he was appointed Assistant in Paleontology in the Museum, and the following year took charge of regular instruction in Zoölogy and Geology to students of the Scientific School; but ill health soon interrupted his work, and he spent two years very profitably in Europe. On returning once more to Cambridge in 1868, he embarked on his life work as lecturer, and the following year was appointed Professor of Paleontology.[1]

Shaler's lectures were vivacious and speculative. He was frank, hearty, alert; he had a picturesque manner of speaking, both in choice of words and intonation — even so simple a monosyllable as 'man' gained a Shaleresque turn on his lips. Following the custom of that era of science, he presented his theories more as their assured advocate than as an impartial judge.

Among his favorite subjects of these earlier years were the geological succession of the brachiopods and the formation of continents. Concerning the latter he appropriately noted that

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[1] In 1888 his title was changed to Professor of Geology, since he had then abandoned paleontology as a subject of special study.

'problems not admitting of accurate determination may nevertheless be studied with profit.' Little attempt was then made to cover the broad subject of geology in a systematic manner. Field work was represented only by his voluntary Saturday excursions, which were largely attended by students from various departments of the University. Not until 1875 did Shaler offer a general course on geology, first listed as Natural History 5, later and long popular as Geology 4. In 1880 an advanced course was added. Three years later a course on Paleontology (Geology 14) was instituted, in which Shaler gave a most attractive review of the progress of life on the earth. It was taken profitably by many who never dreamed of becoming paleontologists.

Through this early period Shaler's outside relations were numerous and varied. He went up and down the Atlantic seaboard for the Coast Survey, of which he later twice refused the superintendency. He conducted a geological survey of Kentucky from 1874 to 1880: a patriotic service to his home state, often laborious and vexatious and at times seemingly of less worth than worry. In 1872 he made a summer trip from Cambridge to central Virginia with his family in a wagon, and himself and ten students on foot. Two sessions of a well-attended summer school centered at a camp in Cumberland Gap, Kentucky, in 1875 and 1876; a third summer school travelled across Massachusetts and into New York. He was thus a pioneer in the use of summer vacations for teaching.

After the year 1875 the number of students entering the geological courses became so great that assistants began to be employed. Ever since, much valuable teaching has been done by young men on temporary appointments. Their total number runs into scores. Limitation of space prevents an adequate account of these men and of the enormous help which they have given their seniors in the administration of the departmental business. Any former assistant or junior instructor who does not find his name mentioned in this history must not conclude that the writers of this chapter in any sense lack appreciation of his contribution to the common fund of achievement.

2. The Growth of the Department, 1875–1906

At the close of Shaler's summer camp at Cumberland Gap in 1875 he invited one of the students there, who had several years before attended his lectures in Cambridge, to become his assistant in field geology; and it was thus that opportunity for teaching at Harvard was opened to William Morris Davis (S.B. 1869). The invitation was perhaps based on the principle of contrast, for two persons more unlike than Shaler and Davis could hardly be found. The younger man was born in Philadelphia in 1850. His boyhood was a period of narrow economy, and the radical abolitionism of his Quaker parents meant ostracism in ante-bellum Philadelphia. Docile and diligent as a schoolboy, in 1866 Davis entered the first class in the Harvard School of Mining, more because of its broad scientific curriculum than with any intention of becoming a mining engineer; and he thus had the opportunity to visit the Rocky Mountains as a member of Whitney's expedition of 1869. After graduating in 1870 he spent three years in South America as assistant in the National Argentine Observatory at Cordova under Dr. Benjamin Apthorp Gould.

In 1876, in consequence of having attended Shaler's summer school in Kentucky, Davis was invited to take charge of the field work in Shaler's classes, and two years later was made Instructor in Physical Geography. For this new work he was ill prepared, and an unfacile lecturer. His teaching, though carefully, indeed laboriously prepared, was so little successful that in 1883 President Eliot wrote him a discouraging letter, advising him to look for a place elsewhere, as his chance for promotion at Harvard was small. By good fortune, his former teacher, Raphael Pumpelly, who was then conducting a geological survey for the Northern Pacific Railway, invited him to undertake a study of the stratigraphic series below the coal-bearing Cretaceous in Montana. There Davis came upon the first fruitful idea that the physical geography of the lands should be presented as exemplifying the natural history of rivers, because rivers are the chief agency in land sculpture; and in the following year, building on the work of Powell, Gilbert, and Chamberlin, he developed the scheme of the cycle of erosion. This greatly fortified his physiographic teaching by introducing a rational or evolutionary motive in the study of land forms which, following the empirical methods of tradition, he had previously taught. In 1885 he was appointed Assistant Professor of Physical Geography, giving both introductory and advanced courses on the physiography of the United States and Europe.

The scheme of the cycle of normal erosion was gradually extended to cycles of marine, glacial, and arid erosion. At the same time Davis made contributions to physiographic terminology. Particularly in the advanced courses which were carried on more by criticism and discussion than by exposition, he developed the deductive method of physiographic investigation, giving it a rank almost equal to that of the inductive method. An excursion to the Alleghanies of Pennsylvania, with a party of his advanced students in the April recess of 1889, was noteworthy in giving opportunity to test the validity of some of his more elaborate deductions, and led to the publication of an analytical essay on the rivers and valleys of that state. Soon after Davis was promoted to a full professorship. During these years he was also studying the Triassic formation of Connecticut for the United States Geological Survey. This was his largest responsibility outside of his duties at Harvard; it proved valuable in giving opportunity for reversing the principle of control of form by structure and permitting the interpretation of structure through form. Davis's classes were never large, for his lectures were argumentative rather than descriptive, much emphasis being given to the reasons for accepting various theoretical explanations as well as to the explanations themselves. Moreover, he took seriously the duty of reporting upon the work of his students, and instead of depending chiefly on one or two announced examinations, he introduced various other tests, including laboratory exercises, although the employment of such exercises in physical geography was then unusual.

In the meantime, the expository field work for beginners in geology was transferred to others, and Davis was given charge of more advanced field studies as a part of Shaler's second course. He then recognized that second-year field work should be directed in the main to selected problems of such nature that they cannot be solved by off-hand observation but only by close and thoughtful scrutiny of the ground; for it was futile to spend time on work that required little effort, and discouraging to give serious effort to problems that cannot be solved. Davis used to advise the field parties that, although the facts observed in the quarries which they visited and the inferences based on the facts would be of very small value through their later life, the capacity to observe facts correctly and to draw inferences logically would always be of value; hence it would be well for them to take the fullest advantage of the opportunity that the excursion provided for observing and inferring.

He at the same time developed the aphorisms, 'Use no term that you cannot define; make no statement that you cannot defend.' This put the better students on their mettle, and those who neglected it were at once given low grades. Thus planned and guided, the work of his field classes became about as assiduous as that of laboratory classes in the physical sciences. The same principles were applied in summer instruction, which he shared for a number of years in the '80's and '90's with J. B. Woodworth.

In view of Davis's increasing attention to the physiography of the land, instruction in meteorology was turned over in 1895–96 to his former student and assistant, Robert DeCourcy Ward (A.B. 1889), who during his junior year at Harvard had developed an interest in meteorology when taking Davis's elementary course in the subject. Devoting much attention to climatology, Ward developed its many relations to life and activity as an important part of human geography, and gradually established several courses in that subject. In 1900 he was made Assistant Professor and ten years later Professor of Climatology, the first to hold such a university professorship in the United States. He translated the first volume of Hann's *Handbuch der Klimatologie*, the standard work on the subject; wrote a volume on Climate, Considered Especially in Relation to Man, for the Science Series; and later prepared a thorough work on The Climates of the United States, in order that teachers and students might find the essential facts of our climates in an easily accessible and fairly simple form.[1]

One of the procession of assistants engaged by Shaler was Jay

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[1] Ward was much concerned in administrative work, and long served as a member of the Administrative Board. Through his outside interests he had become an authority on all problems connected with immigration, a subject that he first took up in his student days, and which he has followed closely ever since. An early advocate of principles that have later been accepted as basis for legislation, he was influential in founding the Immigration Restriction League in 1894, which took on the burden of educating the public on the evils and dangers of unrestricted immigration.

Backus Woodworth (S.B. 1894), who made a strong mark on the laboratory and field teaching of geology at Harvard.[1] Woodworth's boyhood ambition was to become a geologist, but he was unable to enter the Scientific School until 1890, when, at the age of twenty-five, he had accumulated sufficient funds as assistant manager in the Edison Electric Company. As an undergraduate he served as Shaler's personal secretary and Assistant in Field Geology. He was made Instructor in 1893, promoted to Assistant Professor of Geology in 1901 and to Associate Professor in 1912; he served as Chairman of the department from 1904 to 1908. During these years he was placed increasingly in charge of field teaching, and thus came to be exceptionally well informed as to localities in Eastern Massachusetts where geological problems of various kinds were best illustrated. He was remarkably skilful in planning the equipment of the new laboratory which the Department came to occupy in the Museum, and in training students to the efficient and orderly use of the equipment. He had a large share in the management of the Summer School, first in central New York and then for twelve years in the Rocky Mountains of Montana, where some two hundred students came under his skilled instruction. One of them, R. W. Sayles (A.B. 1901), was so impressed with the value of this field course that he gave the University the sum of $10,000 for its permanent maintenance.

Woodworth had an exceptionally clear and keen insight into the philosophy of geological science. He was a wide reader and became well versed in the history of geology, a subject on which he gathered many books, old and new. His explanation of the possible effects of the changes of land forms upon organic evolution, during a cycle of erosion, and his scheme for the larger correlations of the geological history of mountain chains, were far-reaching contributions to his science.

After the Department became the possessor of a seismograph, given by R. W. Sayles, Woodworth operated it, became expert in the interpretation of its records, and made the Harvard station one of the leaders in the recording of earthquakes. He showed that the Museum was slightly tilted when large classes entered and left it, that the earth's crust responded to the passage of atmospheric areas of high and low pressure, and that minute disturbances recorded in the seismograph drum were caused by extra-heavy surf on the ocean shore many miles away. He was President of the Seismological Society of America, 1916–18; and chairman of the National Research Council committee on the use of seismographs in war. First in association with Shaler, later alone, he studied various districts in the Eastern United States for the United States Geological Survey; chief among these were the Narragansett Basin, the Richmond coal field in Virginia, Cape Cod, and the Massachusetts islands, where he showed that the deformation of the Tertiary strata, long celebrated at Gay Head, Martha's Vineyard, had been caused by the thrust of the advancing continental glacier, which left its moraines on the islands. He also made extensive studies of the glacial geology of the Champlain Valley, and in 1908 solved important field problems. His room in the Museum was greatly resorted to by advanced students for guidance in their problems. After 1920 Woodworth's health began to fail; in the session of 1924–25, he was forced to give up teaching, and during the next summer he died, in his sixtieth year.

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[1] R. W. Sayles, 'Jay Backus Woodworth,' in *Harvard Graduates' Magazine*, xxxiv (1926), 395–401.

Robert Tracy Jackson (S.B. 1884), appointed Instructor in 1892, Assistant Professor of Paleontology in 1899, had full charge of the paleontological courses and collections of the University from that date to 1909. With enthusiasm and industry he organized the vast collections in the Museum, and meanwhile gave himself, heart and soul, to the teaching of the science of ancient life. His leading publications illustrate the proofs of organic evolution, found in the long family-trees of fossil species. Thomas Augustus Jaggar (A.B. 1893) became an instructor in the department two years after his graduation from the College, and in 1903 became Assistant Professor. His special field was the teaching of advanced field work; there he showed high originality and converted a technical process into a fascinating art. Jaggar also made notable investigations in experimental geology and in volcanology. In 1906 he became head of the Geological Department of the Massachusetts Institute of Technology. Since then, his energy, unrivalled experience among the world's eruptive vents, and imaginative power, have made him celebrated in volcanology.

While the staff had thus increased under his able administration, Shaler, outgrowing the Department, had become a Harvard institution. He was greatly aided in all his varied undertakings by a strong spirit of self-confidence; he had the full courage, nay, the audacity of his venturesome opinions; and he reserved the right to change them whenever he chose, for consistency was no bugbear to his large mind. His upstanding hair, turning gray, added to his height; his features, although grown somewhat rugged, were still mobile; they could run through the whole range of expression, from the genial smile with which, crossing the street, he would welcome the younger members of the Faculty on their return from a summer vacation, to the terrifying scowl with which he could subdue such reprobates as he did not happen to befriend.

His elementary lecture course had grown to three hundred, even five hundred members,[1] and it was his happy boast that few Harvard men took their degree without coming under his instruction; also that he had lectured to seven thousand enrolled, and no one knew how many non-enrolled students; probably a greater number than had ever before been taught geology by any one man. His lectures were spontaneous revelations of a life-long familiarity with his subject, illuminated with an inexhaustible fund of apposite illustrations, derived from his many contacts with the actual world. His teaching was seldom analytical or argumentative; it was as a rule more broadening and inspiring than minutely systematic and instructive. With the enlargement of the Department and the fuller organization of teaching, Shaler instituted the informal evening conferences in the Museum lecture room, at which the more advanced students as well as the instructors took their turn in making reports upon work in hand as a basis for general discussion; a most advantageous training for all concerned. At the close of each meeting, Shaler and his junior associates adjourned to his adjoining office, where he, lighting his long pipe, would bring forward all manner of subjects and projects related to geology and its teaching; we were thus made to feel that we were all members of one family.

Shaler retained a hand in advanced field-work, in which other instructors also took part. His methods were similar to those of Agassiz in zoölogy; he assigned a student to a field with very little specific instruction about it; and left him to discover what he could find. If the youth could go so far as to formulate the problems that the facts presented and solve some of them,

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[1] Compare the graph of elementary science courses in this volume, p. 197.

Shaler was satisfied; such a student might in time become a geologist. With still more advanced men who undertook longer studies in the summer vacation, one of Shaler's tests was to see if they could live alone with their subject; if they could not endure the solitude of it, they were rejected. Of one unsuccessful student it was concisely said, 'Dogs bite him,' and he was thereupon condemned. Shaler was always fond of terse judgments of that sort.

Shaler's outgoing nature led him to take a very personal interest in his students. He made himself the friend of those alone in the college world, and kept open house for all and sundry on Sunday afternoons.[1] Few knew better than he how to penetrate the diffidence of those in trouble and to rescue them from their difficulties. Perhaps the greatest share of power in that versatile master lay in his human sympathy.

Shaler was a most faithful attendant at college faculty meetings, and a participant in nearly every discussion. Appointed dean of the Lawrence Scientific School in 1891, he revivified an important department of the university, a subject treated elsewhere in this volume.[2] Yet the activities of this 'myriad-minded and multiple-personalitied embodiment of academic and extra-academic matters' (as William James once put it) transcended the limits of his university. He was an active member of Massachusetts commissions concerned with the suppression of the gypsy moth, the preparation of a state topographic map, the construction of highways, and the development of a metropolitan park system. He was also in charge of the Atlantic coast division of the United States Geological Survey, in connection with which he made, aided by various assistants, a number of important researches.

Through these same years Shaler became a productive and versatile writer of books and essays on many subjects, in which his exceptional powers of observation, reflection, and imagination were blended; as when, in writing of the dog, he said, 'In his intercourse with this creature, man first learned to develop his altruistic motive beyond the limits of his kind.' He produced a notable series of popular geological volumes: First Book in Geology (1884), Aspects of the Earth (1889), Nature and

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[1] Shaler lived on Bow Street until 1886, when he removed to the house, formerly President Walker's, on Quincy Street, and which was moved to Divinity Avenue when Emerson Hall was built.

[2] See Dean Hughes's chapter on Engineering, below.

NATHANIEL SOUTHGATE SHALER

JOSIAH DWIGHT WHITNEY

Man in America (1891), The Story of our Continent (1891), Sea and Land (1894), Outlines of the Earth's History (1898), Man and the Earth (1905). The variety of his interests is illustrated by the wide range of other subjects on which he wrote, all characterized by optimism and healthy-mindedness. They include earthquakes, whales, the moon, climate, hurricanes, metal mining, floods, red sunsets, altruism, the silver question, and divers others. When President Eliot conferred the degree of LL.D. upon Shaler as 'naturalist and humanist,' approval was sounded with a roar of applause.

And yet, while carrying on all these varied duties, two other responsibilities were laid upon him, one personal, the other official. His long-time neighbor and friend, Gordon McKay, possessed of great wealth, consulted frequently with Shaler as to its immediate investment and ultimate disposition. After careful and repeated examination by Shaler and others, gold mines in Montana were purchased; they proved highly remunerative. It was largely under Shaler's advice that this large fortune was bequeathed to Harvard for applied science, with engineering as a first beneficiary.

3. From the Death of Shaler to the Present

The Department of Geology was thrown on its beam-ends by Shaler's death in 1906, and righted itself with difficulty. For six years Shaler's elementary course was conducted chiefly by Wolff and Woodworth. Davis had been appointed to the Sturgis-Hooper Chair in 1898,[1] and this was followed by curiously opposed effects on the development of his work at Cambridge. The promotion relieved him from elementary teaching, but as the introductory course in Physiography was then for some twelve years given by a succession of younger and less trained men, his advanced courses were not well fed. The professorship gave him the freedom but not the funds for travel; yet from his fiftieth to his sixty-fourth year (1900–14) he travelled as never before, and thus continued to supplement deductive studies at home with inductive studies in many distant fields, including the western states, Great Britain, Turkestan, Mexico, South Africa, Central and Southern Europe, and

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[1] After Whitney's death, Dr. Hans Reusch, Director of the Geological Survey of Norway, was given a one-year appointment to the Sturgis-Hooper Chair.

Alaska. In 1914 he crossed the Pacific on a study of coral reefs. His long absences from Cambridge worked to the disadvantage of Geography there. Davis resigned the professorship in 1912, to be succeeded in the chair by Reginald Aldworth Daly (A.M. 1893).

Daly, Canadian by birth and a graduate of Victoria University, Toronto, had been connected with the Department as graduate student and Instructor from 1892 to 1901. After conducting courses in General Geology, Physiography, and Oceanography, he resigned his instructorship in order to become geologist for Canada on the International Boundary Commission. Ten years of work resulted in a report on, and map of, a 400-mile belt across the western Cordillera at the 49th parallel, from the Pacific to the Great Plains. Later, two more seasons were devoted to another section, following the line of the Canadian Pacific Railway through the mountains.

When Daly returned to the Department the chief duties assigned to him were those of the Sturgis-Hooper Professor, though for ten years he was to be in charge of Shaler's old course, Geology 4, and to act as Chairman of the Department. His researches have centered in the volcanic-plutonic phase of the science, with field-work (and generally published reports) on the once-molten rocks of New England, Eastern Canada, the Pacific Coast, Europe, South Africa, and the oceanic islands. Among his results are new theories of granitic rocks, of volcanic action, and of mountain-building, which is indissolubly connected with the igneous activity of the globe. These efforts to explain facts, in addition to recording them, have led to a study of modern geophysics and finally to a general theory of the earth's constitution and dynamic history. The broader synthesis is partly sketched in a semi-popular book, Our Mobile Earth. His other researches include synthetic studies on the chemical history of the ocean, the origin of limestone, secular changes of level, glaciation, the origin of coral reefs, the metamorphism of rocks, and the nature of the ore-making and rock-changing gases.

To the Department, geology has meant just what it says: the λόγος of the γῆ, the philosophy of the earth as a whole. Accordingly the members and their students have undertaken, and published the results of, field studies of wide geographical range: in the six continents, and the islands of three oceans. Shaler, Bigelow, Daly, and Raymond have explored the geology of the ocean itself, and all have felt the stimulus of Alexander Agassiz in this field of the planetary study. Davis, Ward, and McAdie have carried on continuous, productive investigations on the atmosphere. Members of the staff, using the new geophysics, have recently been attacking fundamental questions regarding the deep interior of the globe, where lie the secrets of mountain origins, plateau and basin, volcano, earthquake, and ancient geographic revolutions. Thus, from the beginning, the Department has realized one of its principal duties as part of a true university: to teach, as well as to be taught by, the teachers of other universities; to be part of an active 'committee of the whole.'

Geology, both in the College and the University has been greatly promoted by the Shaler Memorial Fund of $30,000, subscribed shortly after his death by many alumni. With its aid a large number of fruitful investigations have already been made by the following: Woodworth in South America; Johnson along the coasts of America and Europe; Atwood in Montana; Raymond in the Appalachians and Europe, a comparative study; Eggleston in Vermont; Davis among the Pacific islands; Daly in Ascension Island, Saint Helena Island, and with Molengraaff and Palache in South Africa; Antevs in the glaciated land of North America; Bryan in that 'geologist's Paradise,' the Southwest.

Similarly, the Sheldon Travelling Fellowships Fund made possible field studies by former instructors: Wilbur G. Foye and Sidney Powers (both PH.D. 1915) in Hawaii, Japan, and Fiji; Sumner W. Cushing (S.B. 1903) in India. The Sayles Fund was indispensable in opening up large areas of Montana and Alberta for investigation and use as bases for summer instruction in field methods. The Sturgis-Hooper Fund has aided Daly to obtain first-hand acquaintance with the classic volcanoes of central France and the marvellous structure of the Alps. For a score of years the George A. Gardner Fund, given for the purchase of photographs and other illustrative material, has much benefited both teaching and research. Space fails for even a listing of the many gifts, so generously made to the Department by its Visiting Committees. The greatest of all single gifts is the splendid main building, built by the children of Alexander Agassiz as a part of the University Museum (1901). Already overcrowded, it cannot house the considerable plant represented in the section of Economic Geology.

The professional resources of the Department have been by no means confined to its own personnel and equipment. For example, generous coöperation in research led Saunders of the Physics Department to guide spectroscopic analysis of minerals, and Bridgman of the same Department to undertake a half-dozen series of fundamental experiments on the elastic properties of rocks and minerals, so important in the interpretation of earthquake waves and in our understanding of the earth's interior. With similar generosity the Department of Geology at the Massachusetts Institute of Technology has long coöperated in the training of Harvard students in advanced economic geology. From the first Alexander G. McAdie has welcomed at the Blue Hill Observatory advanced students of aërography. The Director of the Museum of Comparative Zoölogy has kept open to qualified students the paleontological collection, and has been most liberal in permitting the Department to use the expert services of the Curator of that collection.

Special note should be made of the highly valued appointment in 1926 of Joseph Augustine Cushman (S.B. 1903) as Lecturer on Micro-Paleontology. Without stipend he is accepting research students at his unique, perfectly appointed laboratory in Sharon, Massachusetts. There he is training men to become expert in the exact determination of rock-horizons which are of the utmost importance in the underground search for petroleum. Cushman himself became a master in the immense group of the foraminifera, merely because of his purely scientific interest. After establishing his authority in the field, he was able to show the petroleum companies how to drive their expensive boreholes with increased intelligence and hence with increase of economy. The result is a romance of science: initially 'pure,' finally 'practical' in the highest degree.

The Department, like the general public, has much benefited through large gifts to the Geological Museum by Robert Wilcox Sayles, who from 1907 to 1927 was its efficient Curator. While performing this duty, without stipend, Sayles carried on important scientific investigations; in recognition of these the Corporation in 1928 appointed him Honorary Research Associate, the first to bear this title in the records of the Department.[1]

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[1] See Mr. Sayles's chapter on the Geological Museum, below.

Of late years most of the men professionally trained by the Department have specialized along the lines of economic geology, which naturally offers wider opportunity for a livelihood than that accruing to workers in pure geology. The Department has particularly gained by the whole-hearted devotion of Louis Caryl Graton of the Engineering School to the education of students in geology. Like Smyth, he has freely given them the results of many years of active outdoor research; and now Donald Hamilton McLaughlin (PH.D. 1917), another member of the Engineering School, is likewise brilliantly illustrating the power of interdepartmental coöperation in the training of Harvard men.

In 1923 the Department was fortunate in securing the appointment of Kirtley Fletcher Mather (PH.D. Chicago 1915) as Associate Professor of Physiography. The next year he relieved the Sturgis-Hooper Professor of the duties of chairman of the Department, and in 1927 was made Professor of Geology. One of his principal duties has been the conduct of Geology 4 and Geology 5. His clearness and thoroughness in presentation, his controlled enthusiasm for his many-sided subject, and his skill in accenting essentials are drawing large numbers of students to his lectures.

For too many years the Department was not sufficiently staffed for the middle-group courses of instruction in General Geology. The lack began to be filled when Percy Edward Raymond (PH.D. Yale 1905) added his masterly course in Stratigraphy, while attracting many students by his philosophical treatment of paleontology.[1] Then Mather enriched the middle group with courses on Glacial Geology, Regional Geology, and the Geology of Petroleum, which itself involves much knowledge of the structure of the earth's crust. Further notable strengthening resulted from the half-time appointment of Léon Collet (D.SC. Geneva 1904), Professor of Geology at the University of Geneva. With marked success he has been unfolding to Harvard men the intricate, truly dramatic genesis and history of the Alps; in a second course (with Daly) discussing the more advanced problems of general geology; and in a third course giving a much needed survey of the structure of Europe as a whole. Collet also acted as the chief guide in the Alpine region for the large summer class of 1928, organized and led by Mather. Finally, in 1928 the Department was able to secure the services of Noel Ewart Odell (A.R.S.M. Royal School of Mines, London, 1922), geologist of the Mount Everest Expedition, who is conducting middle-group courses in Glacial and Structural Geology.

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[1] An account of Raymond's important researches appears in Mr. Agassiz's chapter on the Zoölogical Museum, below.

Geographical instruction and research have had a somewhat chequered career. Davis's work in this field first made the Department known throughout the world. After he accepted the Sturgis-Hooper Professorship, the responsibility of conducting the elementary and middle-group courses in the Geography of the Lands fell upon Douglas Wilson Johnson (PH.D. Columbia 1903), who ably served the University for six years. He resigned in 1912 in order to accept an attractive chair at Columbia, where he too has won a European reputation. He was succeeded at Harvard by Wallace Walter Atwood (PH.D. Chicago 1903), whose attractive personality and remarkable power of exposition brought many students into the geographical classes. In 1920 he resigned to become president of Clark University. With his resignation Human Geography had to be omitted from the offerings of the Department, and, until Mather was appointed, even Physiography was not systematically taught. In 1926 Kirk Bryan (PH.D. Yale 1920), skilled in field methods and a special authority on the work of underground water and on the geological processes operating under an arid climate, was added to the staff; by gradual adjustment of the courses he is now able to devote most of his time to the physiography of the lands. In 1928 Human Geography became once more represented in the Department by the half-time appointment of a leader in this important subject, Raoul Blanchard, Professor of Geography in the University of Grenoble. At the same time Derwent Stainthorpe Whittlesey (PH.D. Chicago 1920), who had shown excellent quality in the staff of the University of Chicago, was here appointed Assistant Professor of (Human) Geography.

More uniformly administered has been the work in the geography of the atmosphere. For many years Davis' textbook of Meteorology was the best published in the English language, and it still remains after thirty years one of the most useful presentations of the subject. Since 1895 Ward has continued to uphold the high standard set by Davis, and with rare perfection of finish and with great thoroughness has continued to set the standard for the teaching of Meteorology. In addition, Ward has become the national leader in the field of Climatology. McAdie, holding the Rotch Professorship of Meteorology, has continued to publish the unique series of observations which for more than forty years have been recorded at the Blue Hill Observatory. These observations are fundamentally important for the science of the air and therefore for climatology; of special significance have been McAdie's explorations of the upper air. An account of his researches and of his administration of the Observatory will be found elsewhere in this history.

On the other hand, systematic study of the oceans has been sadly neglected, even in a Department which has been housed in the Museum built and equipped so largely through the munificence of Alexander Agassiz. From 1899 to 1901 Daly conducted a course on Oceanography and proved the vital importance of this grand subject for a well-rounded Department of Geology and Geography. After 1901 no special instruction concerning the nature and history of the oceans was given until Henry Bryant Bigelow (A.B. 1901) without stipend, generously offered a research course, in the year 1926. What of the future? Perhaps readers of this history will decide what Harvard ought to do with seventy per cent of the earth's surface!

Petrography was formerly included in the Department's oeffrings, but in 1895 it was transferred to the Department of Mineralogy. The activities of the successive Professors of Petrography, Wolff and Larsen, and those of the Professor of Mineralogy, Palache, are described in another chapter of the present volume. However, it is quite appropriate to note here that Wolff and Palache have successively acted as chairmen of the Division of Geology, and accordingly have done important and much appreciated service for the Department of Geology and Geography by administering the programmes for the higher degrees. Largely owing to well-proved confidence in the scientific integrity and ideals of both of these leaders, large endowments for mineralogy and petrography have come to the University. One of many resulting benefits to the geologists has been the formation of a fine Mineralogical Library, which is freely open to students and officers of the sister Department of Geology and Geography. Still more has this Department gained by Palache's masterly development of Mineralogy at Harvard, with respect to both equipment and methods. The depth and width of his scholarship are illustrated by the fact that he was selected as one of the chief authors to revise Dana's System of Mineralogy, the standard work of reference on the subject and an indispensable handbook for the geologist.

The story of the vital section of applied geology has already been briefly sketched; it is more fully told in the chapter concerned with the School of Engineering.

At the present time the Department of Geology and Geography as a teaching organization has the best equipment in its history. The quality of its staff is suggested by the result of Cattell's canvass of the geological profession in the United States, in the 1927 edition of American Men of Science. The geologists and geographers of the country voted that, as regards leadership in professional research, the Harvard Department stands first among the universities of the land. Steadily supporting the policy of the Corporation, the Department has avoided anything like in-breeding as it has recommended new appointments. Of the fourteen active members of the staff in 1928, only three hold the bachelor's degree from Harvard. Of these, two have in addition the Harvard doctor's degree, which was also won by two of their colleagues. The other nine teachers were trained elsewhere; they have brought with them the refreshment which comes from the meeting of different schools of thought.

Large as the Department is, its members are taxed to meet adequately the needs of an ever-increasing body of students. The total of the 'takings' by students in terms of completed courses is now at maximum. The Department is still insufficiently equipped in Geophysics, Oceanography, and Human Geography; in each of these fields at least one endowed professorship is urgently needed.

Many things have been accomplished; yet the real tale of the Department's endeavor, these many decades, cannot be written by us; for it is to be found in the lives of ten thousand men who have thronged our laboratories and lecture halls. And we close with the feeling that Shaler so well expressed in the last sentence of one of his letters:

'There is a world of work on hand.'

XX. THE GEOLOGICAL MUSEUM

1907–1929

By Robert W. Sayles, A.B.
Research Associate in the Division of Geology

THE completion of the southwest wing of the University Museum in 1901, erected by the children of Louis Agassiz, made possible the expansion of geological activities at Harvard. For the first time it was possible to have a geological museum in the University. Three rooms and a hallway on the second floor were set aside for exhibition purposes, but the Geological Museum was slow in starting. Although committees were appointed and votes were recorded in department meetings, nothing was accomplished until November, 1904, when Alexander Agassiz presented five wall cases, and the Corporation granted the Geology Department $1,160.12 for two new central cases. In a short time these were installed in the southwest room, leaving the other two rooms for storage and expansion.

Although the Geological Section of the Museum was under the control of the Faculty of the Museum of Comparative Zoölogy and its Director; Mr. Agassiz and his successors have left the direction to the Department of Geology and Geography, which appointed a committee on the Museum in 1904: Professors R. T. Jackson, Jaggar, Wolff, and Woodworth. This committee took entire charge until 1907, when R. W. Sayles (A.B. 1901) of Norwich, Connecticut, a former student of Woodworth's, was appointed Assistant in Charge of the Geological Collections by the Faculty of the Museum.[1] In the autumn of 1907 Sayles undertook the collection and installation of specimens. His chief aiders and abettors in the Department of Geology were Woodworth and Jackson: the latter gave most valuable advice on museum technique.

The only plan at this time was to have the large corner room devoted to Structural, Dynamical, and Stratigraphical Geology.

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[1] Mr. Sayles became Curator of the Geological Collections in 1912, and retired in 1928. He has freely spent his time, energy, and fortune in building up the geological collections. Many of the exhibits have been purchased or procured by him at large expense. The Geological Museum is distinctly his creation. S. E. M.

The Assistant in Charge continued this work by collecting, purchasing, and procuring gifts of specimens. The type of white plaster mount devised by Dr. Henry F. Libby for use with the glass flowers of the Botanical Department, was adopted with much success for rock specimens.

By 1909 the capacity of the southwest room for exhibition cases was exhausted. Four years later, cases were built in the north room, and a collection illustrating economic geology was started. Generous gifts — about 500 metallic ores and minerals from Professor Henry Lloyd Smyth and non-metallic material from the Mineralogical Department and Professor Charles Palache, as well as specimens collected in the West by George M. Flint, Preparator of the Department — made a good beginning in 1914 for the economic collections. From the Shattuck mine at Bisbee, Arizona, were obtained some of the unique stalagmites lately discovered. These magnificent specimens, some of them six feet long, and others of strange and as yet unaccountable shapes, were installed in lighted cases. In the meantime, the southeast room was furnished with new cases especially designed for geographical exhibits. Here may be seen the banner used by Louis Agassiz on the Rhone Glacier, and a meteorological exhibit arranged by Professor Robert De Courcy Ward.

Since 1914, the story of the Museum has been that of the gradual enrichment of its collections, through the devotion of a few and the generosity of many. Among the more important acquisitions have been: a model of the volcano Kilauea, completed in 1917, after four years' labor, by George Carroll Curtis (S.B. 1896), with the aid of photographs of lava flow made from kites by Mr. J. F. Haworth of Pittsburgh; the stratigraphic collection begun in 1926–27 by Henry C. Stetson (A.B. 1923), with gifts of fossils from Professor Raymond; a collection of jointed rocks made by J. B. Woodworth; a collection made by Jaggar and Curtis of volcanic products from the eruption of Mont Pelée in 1902, together with a model of the ruin of St. Pierre, showing the action of masonry and brickwork in an earthquake; a collection of tillites from various parts of the earth, representing glacial periods from the earliest pre-Cambrian period to the Pleistocene period; a collection of sands from various Pacific islands, made by Professor Davis; a collection of twenty-five specimens, given by the Boston Society of Natural History, illustrating processes in dynamical and structural geology; a collection of photomicrographs of coal, made by Professor E. C. Jeffrey of the Botanical Department; a collection of specimens of asbestos from Africa, given by Professor Palache, together with a collection of asbestos products given by the Johns-Manville Company; a collection of Cripple Creek minerals and ores given by Mrs. August R. Meyer of Kansas City, and collected by her husband; a collection of large granite cubes given by various granite companies; the Woodworth collection of engravings of the founders of geology.

Although primarily arranged for the benefit of students in the University, the Geological Museum has attracted considerable public interest, and since 1914 has been open to the public every day in the year except July 4 and Christmas. The most popular exhibits are the large stalactites, the model of Kilauea, and the large model of the Boston Basin, a more or less permanent loan from the Commonwealth of Massachusetts.

XXI. MINERALOGY

1869–1928

By Charles Palache, Ph.D.
Professor of Mineralogy

1. The Mineralogical Museum

THE Harvard Mineralogical Cabinet, begun in 1784 by Benjamin Waterhouse, is the oldest collection of objects of natural history in the University. It was a bone of contention between Dr. Waterhouse and the Massachusetts Professor of Natural History, William D. Peck, who wrested the curatorship from him in 1809. Peck was succeeded in 1824 by Professor John W. Webster, and, after his execution, in 1850, by Professor Josiah P. Cooke,[1] who moved the collection from Harvard to Boylston Hall, where it was exhibited in 1869. It was cherished by Professor Cooke, who not only had it rearranged, labelled, and catalogued, but added to it abundantly from his own means, by exchange, and by gifts from generous friends. President Eliot, in a letter dated May 15, 1915, to Professor Wolff, records:

> In the summers of 1850–51–52, I accompanied Professor Cooke on journeys undertaken for the collection of specimens for the cabinet. We did some field work ourselves; but for the most part Professor Cooke bought specimens at or near well-known localities. Thereafter, to the best of my knowledge and belief, the cabinet was enlarged and improved only by purchase, gift and exchange up to the death of Professor Cooke.

The acquisition of the Liebener Collection in 1869 added greatly to the importance of the Harvard Collection; and in 1883 the purchase by subscription of the J. Lawrence Smith Collection of Meteorites established a new and valuable department.

The section of the University Museum now devoted to Mineralogy and Botany was erected in 1890–91, Professor Cooke having been the active spirit in obtaining half the building fund for Mineralogy. In 1891 the minerals were newly installed in their present quarters, where Professor Cooke continued his active

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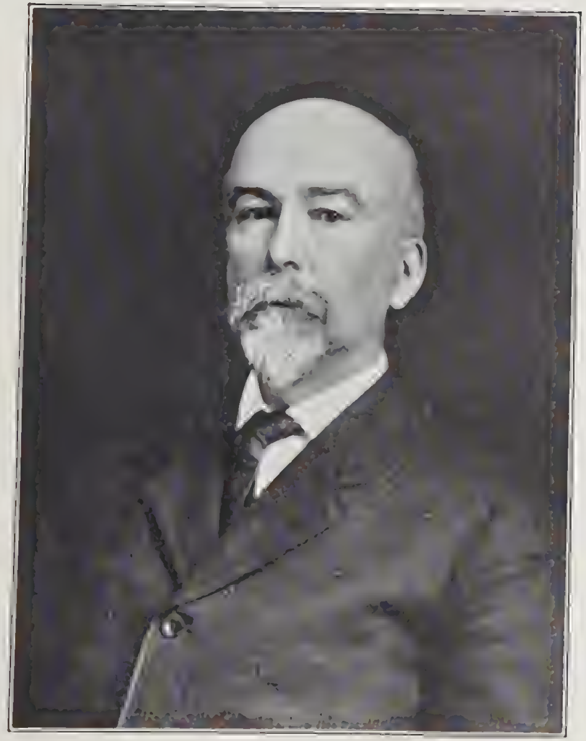
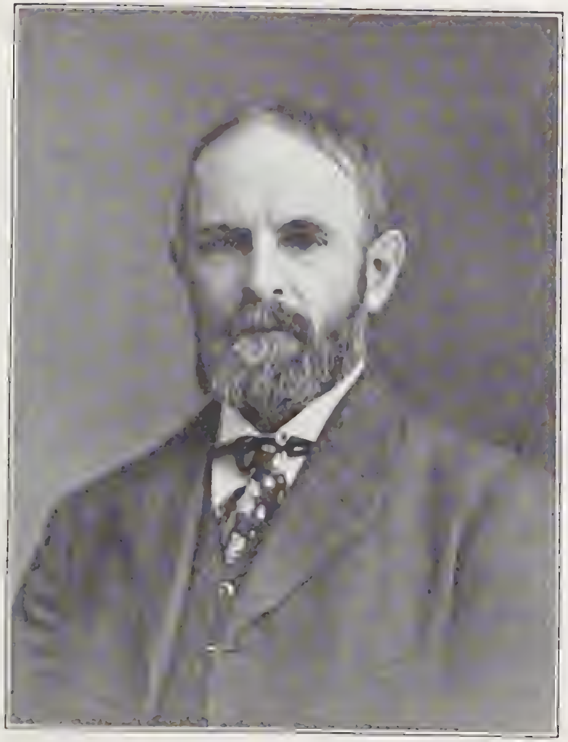
[1] See the chapter on Chemistry, in this volume.

GRATON MATHER WARD

THREE HARVARD GEOLOGISTS



WILLIAM MORRIS DAVIS



JOHN ELIOT WOLFF

interest. The culmination of his additions came in 1892 with the gifts of the Hamlin Collection of Maine Tourmalines, the Garland Gem Minerals, and the Bigelow Agates. After his death, in 1894, a marble bust and tablet were placed on the wall of the Museum, testifying to his principal part in the development of the cabinet through more than forty years.

In 1895, Dr. John Eliot Wolff (A.B. 1879) was appointed Professor of Petrography and Mineralogy, and Curator of the Mineralogical Museum. Under his care the collection was rearranged and largely increased, the funds for the purchase of specimens being generously supplied from his own means, as there was no endowment. For nearly thirty years he took entire charge of the collection, installing Nernst lights and new cases; labelling and cataloguing the specimens; and, without any secretarial help, carrying on the considerable correspondence involved in the growth of the collection. Professor Wolff's most important work, however, was in securing the future of the collection through endowment.

Albert Fairchild Holden (A.B. 1888), a very successful mining engineer of Cleveland, Ohio, began early in his professional career to collect the minerals he found in his mines; and from this beginning rapidly accumulated an important collection. Holden intended his collection to go ultimately to Harvard, and to that end kept in close touch with Wolff, so that his minerals might supplement, instead of duplicate, the Harvard cabinet. When Holden realized that his career was destined to come to an untimely end through an incurable disease, he conferred with Wolff as to the form of the munificent bequest with which he had determined to endow the Harvard Collection. Part of the terms of his deed of gift are here given in order to show the wide scope of his interest.

Cleveland, O. Nov. 12, 1913.

To
A. LAWRENCE LOWELL
President, Harvard University

MY DEAR MR. LOWELL

I have trusteed with F. H. Goff and B. P. Bole of Cleveland, Ohio, securities which I estimate to have a value of $500,000.00. These they are, as soon as convenient after my death, to turn over to the President and Fellows of Harvard College for the benefit of the Mineralogical Museum and Department.

I have also placed in the hands of the trustees to be delivered after my death, my entire mineralogical collection wherever the same or parts of it may be located, together with all mineral cases and scientific instruments, including microscopes, which I may own at the time of my death.

If these gifts reach the University as I intend they shall, I request the donations be accepted on the following understandings.

In regard to the mineralogical collection. There shall be no obligation on the Museum authorities to keep any of the specimens when they have lost their scientific interest. There will be many duplications as the result of taking over my collection. All duplicates, if from my collection, may be sold, exchanged, used for scientific purposes or given away. I only ask that specimens shall not be removed from the collection until others as good or better have been provided. It is my desire not to handicap the development of the Mineralogical Department. I wish to aid in bringing the Harvard Mineralogical collection to the highest possible standard.

. . . .

I wish this bequest to be interpreted liberally by the Corporation in such a manner that it shall assist in building the mineralogical department of Harvard so that it may be the best in the world.

Truly yours,

A. F. Holden

Holden died before the end of the year, and his minerals came at once to the University. Professor Wolff, during the next few years, spent all his free time incorporating into the exhibition collection the more striking specimens from Holden's cases. It was not until eight years after Holden's death that the trustees of his estate were able to turn over to the University the endowment fund. Meanwhile, the collection, having no income, did not increase much except through a noteworthy purchase in 1917 of the private collection of E. P. Hancock of Burlington, New Jersey. Mr. Holden had planned the purchase of this collection, whenever it should become available, and the trustees advanced the needed funds when the death of Mr. Hancock made immediate action necessary.

A bronze tablet with a full-face portrait bas-relief of Mr. Holden, executed by H. N. Matzen, the gift of his family, is set in the east wall of the Museum.

By 1922 the Holden Fund had been received, and Professor Wolff decided that this event marked a proper termination of his active service for the Museum and Department of Mineralogy. He therefore retired at Commencement, 1923, and left to the writer the acceptable task of carrying out the intent of Mr. Holden with the generous funds provided. But he has given further testimony of his love for the Mineralogical Museum by donating to the University his whole estate, in the form of the John E. and Philip Wolff Fund, the income of which, after his death, is to be devoted to the growth and use of the collection to which he devoted so large a share of his life.

Since 1922 the Mineralogical Museum has grown vigorously. Both the collection of minerals and the income from the endowment are larger than those of any other university collection in the world. Constant accessions have been made both to display and to study collections; it has been possible to publish freely the results of investigations made by the increased staff of the Department; the Library has grown to nearly double its original size; new cases for storage of collections in laboratories and for exhibition have been provided; and a start has been made on newly casing and arranging the main exhibition collection in order to enhance its value to the public. The fund for travel has been particularly fruitful in giving opportunity for numerous expeditions for collection and research.

2. The Department of Mineralogy and Petrography

In 1869 mineralogy was taught in Harvard University as a branch of chemistry by J. P. Cooke, Erving Professor of Chemistry and Mineralogy.[1] Later, he was assisted by Dr. Oliver W. Huntington (A.B. 1881). This relation continued until the death of Professor Cooke in 1894. In 1895 the new Department of Mineralogy and Petrography was organized, with John Eliot Wolff in charge. Dr. Wolff had begun teaching petrography in 1886–87 in the Department of Geology and Geography. He was made Professor of Mineralogy and Petrography in 1895, and took over the courses in Mineralogy; he also carried on the teaching of petrography, and, as we have seen, the curatorship of the Mineralogical Museum. In 1895 the writer, having taken his doctor's degree at the University of California the year before, joined the staff as Museum Assistant and became Instructor the next year.[1] These two, with the aid of a single assistant, generally a graduate student in geology or mineralogy, conducted the courses in the two subjects, Wolff taking Petrography and Optical Mineralogy, and Palache, Mineralogy and Crystallography, while both guided advanced students in research courses. This arrangement continued until Wolff's retirement in 1923. Dr. Esper S. Larsen, Jr., was then appointed Professor of Petrography, and the resources of the Holden Fund, then first available, enabled us to have two teaching assistants, as well as a secretary and two or more Museum assistants, on the staff.

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[1] See Professor's Jackson's chapter in this volume.

Professor Wolff was one of the first American teachers to offer to students the methods of microscopic determination of rock-forming minerals developed by German petrographers, especially those of Rosenbusch, with whom he had studied. Palache introduced to this country the methods of two-circle crystal measurement and graphical projection, as taught him in Heidelberg by Professor V. Goldschmidt. Larsen, coming to Harvard after a long service in the United States Geological Survey in the Petrographic Branch, is the recognized authority in the use of modern methods of optical determination of minerals. Although no textbooks have been contributed by the staff, the Department has issued a considerable number of papers devoted to the accurate description of American minerals, especially marked by full crystallographic, optical, and chemical data. Larsen and Palache are now co-authors, with Professors Ford and Foote of Yale, in the revision of Dana's System of Mineralogy, a reference book used throughout the world wherever mineralogy is taught.

The following list of some of the men who in succeeding years have acted as assistants in the Department of Mineralogy and Petrography shows how wide is the range of interest aroused by their work as graduate students at Harvard:

Charles L. Whittle (L.S.S. 1883–89). Mining Geologist, Boston.

Frederick Leslie Ransome (PH.D. California, 1896). Assistant at Harvard, 1896–97; U. S. Geological Survey, 1897–1923; Professor of Economic Geology, California Institute of Technology.

Arthur S. Eakle (PH.D. Munich, 1896). Assistant 1897–1900; Professor of Mineralogy, University of California.

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[1] Assistant Professor, 1902; Professor of Mineralogy, 1912.

Louis M. Prindle (Graduate School 1900–02). Geologist, U. S. Geological Survey.

Hoyt S. Gale (A.B. 1900, S.B. 1902). Petroleum geologist, California.

Harry O. Wood (A.B. 1902, A.M. 1904). Seismologist, National Research Council.

Ralph W. Richards (Graduate School 1903–04). Petroleum geologist, Washington.

Herbert E. Merwin (S.B. 1908, PH.D. 1911). Chemist, Geophysical Laboratory, Washington.

Ransom E. Somers (A.B. 1908, A.M. 1910). Professor of Geology, University of Pittsburg.

Wilbur G. Foye (A.M. 1912, PH.D. 1915). Professor of Geology, Wesleyan University.

Alfred Wandtke (PH.D. 1917). Mining Engineer, Mexico.

Joseph L. Gillson (S.D. M.I.T., 1923). Professor of Mineralogy, Massachusetts Institute of Technology.

Kenneth K. Landes (A.M. 1923). Professor of Geology, University of Kansas.

Isador A. Ettlinger (A.M. 1923). Economic geologist, New York.

Ian Campbell (A.M. Oregon, 1924). Professor of Mineralogy, Louisiana State University.

Roy W. Goranson (A.M. 1923). Chemist, Geophysical Laboratory.

XXII. BOTANY

1869–1929

By Benjamin Lincoln Robinson, Ph.D.

Asa Gray Professor of Systematic Botany and Curator of the Gray Herbarium

IN reviewing the progress of Botany at Harvard University during the past sixty years, it will be desirable first to describe the growth of teaching in this subject, then to trace the origin and development of the botanical establishments of the University. These are exceptionally numerous, and have come into being in no instance through previous plan or special design of the Governing Boards, but as the result of restricted gifts and legacies, or through the energy of the teaching staff backed by sympathetic support of interested patrons living mostly in Boston or its suburbs. This mode of development acquires a certain interest from the fact that in extent and variety it has no parallel in this science at any other academic centre, either in America or in Europe.

In summarizing the history of the Arboretum, the writer has drawn freely on an account happily brought together by its late Director[1] after fifty years of distinguished service. Regarding the Farlow Herbarium and the Botanical Museum, the writer is much indebted to his colleagues, Thaxter and Ames, for full and careful information, which, in the interests of uniformity, he has been kindly permitted to restate, and which, owing to limits of space, he has been unhappily obliged somewhat to curtail.

1. Botanical Instruction

Botany at Harvard, prior to the 'seventies, was almost confined to the gross morphology and elementary classification of the flowering plants and ferns. The compound microscope was still crude. An effective microtome had not been devised. Aniline stains, an important aid to microscopic study of plant tissues, were as yet little developed. Plant-anatomy was therefore restricted to a few of its more obvious facts and generalizations. Cryptogamic botany, a subject largely dependent upon microscopic research, was little advanced, and in America pursued chiefly by amateurs, few and scattered. Its importance in plant-pathology had been scarcely grasped. Organic chemistry was still too primitive to permit much progress in plant-physiology. Cytology, as a separate discipline, was as yet unimagined. The developmental theory was new and still subject to violent controversy. Many of its logical consequences, including the subject of genetics, had not yet manifested themselves.

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[1] Sargent, 'The First Fifty Years of the Arnold Arboretum,' *Journal of the Arnold Arboretum*, iii (1922), 127–171.

Although thus restricted in field, Harvard's early botanical offerings were admirable of their kind and certainly, for their period, unsurpassed in America. Dr. Asa Gray had held since 1842 the Fisher Professorship of Natural History, a chair devoted from the first to the botanical aspects of biology. He was a brilliant investigator in plant-taxonomy, a writer of exceptional lucidity, copious in his output, and gifted both in technical and popular presentation — a man whose fame in botany was similar to Agassiz' in zoölogy, and whose influence upon education through his numerous and excellent textbooks, still used in many American schools, must have been even greater.

Botany, presented for the most part as a single course, and often disguised under the title Natural History, had in the eighteen-fifties and early 'sixties been a part of the curriculum; in 1864 it was made an elective open to Juniors. It was thus one of the pioneer subjects in the important change from prescribed to elective status, which later became general. In addition to this Junior elective, given in 1869–70 in Harvard Hall and taken by 105 students, Gray offered a second and more advanced course for Seniors, with exercises conducted chiefly at the Botanic Garden. Besides giving these formal courses, he was untiring in his aid of research on the part of the visiting scientists who were attracted to the Herbarium by its wealth of reference specimens or for the guidance of a skilled master.

Gray, after nearly thirty years of service, was anxious to be relieved of routine, that he might devote his time to a flora of North America, an enterprise of magnitude for which he had accumulated vast materials. To effect this relief, as well as to expand botanical opportunity at Harvard, four men were appointed in the years 1872 to 1874, George Lincoln Goodale (M.D. 1863), Charles Sprague Sargent (A.B. 1862), William Gilson Farlow (A.B. 1866), and Sereno Watson. Though more unlike personal types could scarcely be conceived, the University was exceedingly fortunate to secure in that transitional period a group of botanists of such capacity and strength, each destined to long service and high distinction in his respective field.

Neither Sargent nor Watson need be considered at this point. Important as they were in caring for other scientific interests of the University, they took little part in the instruction.

Under the guidance of Goodale and Farlow, botanical instruction at Harvard was greatly expanded during the last quarter of the nineteenth century. Goodale, a plant-physiologist by choice of field, was a finished lecturer. As a teacher he accordingly attained his chief success in the more elementary and popular exposition of his subject. His introductory course was one of exceptional excellence and is gratefully remembered by hundreds of graduates. His abilities as a speaker enabled him greatly to extend Harvard educational influence by addressing large popular courses at the Lowell Institute, the Cooper Union, and elsewhere. He was also highly gifted as an organizer of scientific enterprises, skilfully fostering interest in them and liberality toward their needs. To his efforts Harvard owes the Botanical Section of the University Museum, completed in 1890. This contributed much to the advance of botany at Harvard, since it provided the courses of instruction, previously held in cramped quarters at Harvard and Massachusetts Halls or at the Botanic Garden, with lecture rooms and laboratories of unsurpassed extent and excellence for that period. He also devoted special care to the development of large collections of illustrative material, particularly in economic botany, to which in his later years he directed increasing attention.

Farlow assisted Gray during 1870–72, and then spent two years in Europe, chiefly in the laboratories of De Bary at Strasburg and in the study of cryptogamic botany. After his return to America, he held from 1874 to 1879 an assistant professorship in Botany with duties chiefly at the Bussey Institution, where he gave instruction and conducted research in phytopathology. In 1879 he transferred his activities to Cambridge, and was made Professor of Cryptogamic Botany, being probably the first to hold an independent chair of this nature in any American university.

Though less skilled as a speaker than Goodale, he had an incisive style of his own. It commanded close attention and was often enlivened by facetious comments. By talents and training far in advance of American contemporaries in cryptogamic botany, Farlow soon attracted to his laboratories students of keenness and ability. Remarkably well read in all phases of his subject, he was a close observer, and inclined to be a rather sharp critic. He was very stimulating as a director of laboratory and research work. Though not copious in his writings, he exerted a profound influence upon his science, for he trained and inspired probably more students of ability in his field than any other American cryptogamist.

In the 'eighties and 'nineties botany throve in the University. More and more students elected the subject. New phases of the science began to receive attention. Of those who in this general period were temporarily attached to the botanical teaching staff and took their several parts in these developments, there may be mentioned: Charles Edward Faxon (S.B. 1867), instructor from 1879 to 1884 and later widely known as a skilful botanical artist; Nathaniel Thayer Kidder (B.A.S. 1882), instructor at the Bussey Institution, 1884–95; Hollis Webster (A.B. 1884) and Kenelm Winslow (B.A.S. 1883), who taught botany successively at the Veterinary School, 1884–1901; William Francis Ganong (A.B. 1887), Herbert Lyon Jones (A.B. 1892), and Edgar William Olive (A.M. 1897), successively Instructors in Phanerogamic Botany, 1889–1903; Herbert Maule Richards (S.B. 1891), Instructor in Cryptogamic Botany, 1897–98, and Jesse More Greenman (S.M. 1899), Instructor in Botanical Geography, 1902–05.

Important in the more permanent development of the Department was the appointment in 1891 of Dr. Roland Thaxter (A.B. 1882), one of Farlow's earliest students, who was called from the Connecticut Agricultural Experiment Station at New Haven to aid him to meet the growing demands for cryptogamic instruction. Gifted as a very clear lecturer, and exceptionally skilled in microscopic technique and as a draftsman of highly magnified organisms, Thaxter succeeded to Farlow's chair in 1901. Like his predecessor, he was eminently successful in stimulating critical research of an original nature, and thus training men both for academic positions and for posts in applied science requiring expert knowledge of cryptogamic botany, as for instance investigations in plant-pathology, fermentation, purification of water supplies, preservation of timber, vegetable parasites on insects, and similar highly technical subjects.

From 1890 John G. Jack (from 1908 as Assistant Professor of Dendrology) has given instruction, both popular and technical, regarding trees and shrubs in connection with the Arnold Arboretum, where the wealth of illustrative material for such work is unparalleled. His courses and field excursions have been taken by many persons not otherwise registered in the University, and have notably extended its influence in a subject of much general interest.

Since 1900 botany at Harvard has been further developed and specialized. Several phases of the science, previously presented incidentally or only as to their elements, had become so important as to demand representation in the teaching staff. These have been taxonomy in its more advanced and phytogeographic aspects, morphology of the vegetable tissues (including cytology), plant-physiology in its newer and chemico-physical phases, economic botany, experimental plant-morphology or genetics, and plant-pathology. These may be considered in the order mentioned.

In 1899 Benjamin Lincoln Robinson (A.B. 1887) was appointed Asa Gray Professor of Systematic Botany. This newly established chair, united with the curatorship of the Herbarium, was founded through the liberality of Mrs. Gray. It was created primarily for research, and did not entail teaching; but from 1902 Robinson has offered a research course on the Taxonomy of the Phanerogams. The plant groups selected for study in this course have been mostly those of the tropics. The course has been taken chiefly by young men fitting themselves for professional work as teachers, as government experts, or for enterprises of tropical agriculture.

Merritt L. Fernald (S.B. 1897), who for more than ten years had been assistant at the Herbarium, was made Instructor in Botany in 1902 and in 1915 was promoted to the Fisher chair of Natural History in succession to Gray and Goodale. Distinguished by the extent and effectiveness of his personal exploration as well as by his copious and critical publications, Fernald brought to his instruction an unequalled knowledge of the boreal American floras. His teaching has been notable for its closely reasoned interpretation of such controlling factors in the development of floras as soil-composition, glaciation, local elevation or subsidence of land areas, temporary maritime or estuarine conditions, and so forth.

In the field of anatomy, Edward C. Jeffrey (PH.D. 1899) was called from the University of Toronto and appointed in 1902 Assistant Professor of Vegetable Histology and in 1907 Professor of Plant Morphology. Expert in microscopic technique and in the delicate processes of photomicography, he brought to his teaching not only detailed knowledge of extant plant-anatomy, but a wide acquaintance with paleophytology, permitting him to treat such intricate and controversial matters as the phylogenetic relation and sequence of the major groups, the antiquity of lignescence, composition of coal, and similar problems. He has also devoted much attention to cytology, notably to those cell-phenomena which are associated with hybridity. His instruction and ingeniously equipped laboratories have been inspiring to those anxious to perfect themselves in the delicate manipulation of the microtome and in other technique essential to progress in anatomical investigation.

In connection with the School of Forestry, Irving W. Bailey (A.B. 1907), instructor from 1909 and Professor of Forestry since 1927, has given at the Bussey Institution courses on Wood-structure and in Comparative, Physiological, and Pathological Plant-anatomy, at first in coöperation with Professor Jeffrey, and soon independently. Bailey has also dealt with plant-ecology or the effects of environment upon the form, structure, and distribution of vascular plants.

Probably no phase of botany has in recent years been so transformed as plant-physiology. The changes which have come about in this subject have been synchronous with, and largely dependent upon, rapid advances in physics and chemistry. To present the newer and far more technical aspects of plant-physiology, Winthrop J. V. Osterhout was called from the University of California in 1909, as Assistant Professor, and became Professor of Botany four years later. Besides conducting courses in his special field, he was intrusted with the general introductory course in Botany, long carried by Goodale. Osterhout, distinguished as an ingenious and original investigator, accepted in 1925 a position at the Rockefeller Institute. Since that time, such phases of plant-physiology as relate chiefly to protoplasm and the cell have been transferred to the newly created Department of Physiology.

The practical or applied phases of botany are of an extent and variety seldom realized by the layman. The science deals with plant life in all its aspects, and therefore becomes the chief source of basic knowledge for those engaged in the plant industries. These include agriculture, horticulture, and important parts of medicine, pharmacy, and forestry. They also extend to technical operations of magnitude, such as those having to do with fibres, rubber, tannin, resins and varnishes, wood-pulp, fermentation, and so forth. To present at Harvard these economic aspects of botany, Oakes Ames (A.B. 1898), Instructor in Botany, and Professor from 1927, has since 1918 given a comprehensive course in Economic Botany, for which he has assembled with great care and from many countries the needful illustrative material. Since 1925 Ames has also been in charge of the botanical part of Biology 1, a coöperative attempt to present the outlines of organic science as a cultural subject. In this he has been much aided by Assistant Professor Ralph H. Wetmore (A.M. 1922), who conducts also the introductory course in Botany.

Two branches of botany are still to be mentioned, both being of much significance to human welfare. They are plant-genetics, dealing with processes like selection, hybridization, and artificial changes of environment, by which cultivated plant-stocks are ameliorated for man's use, and plant-pathology, the key to successful effort in combatting diseases of vegetation, especially of crop-plants. In the first of these branches Harvard has had since 1909 the expert services of Edward M. East (Professor of Plant Morphology since 1914), who was called from the University of Illinois. His work has been chiefly at the Bussey Institution, where he has given preliminary and advanced training to those specializing in his important field. To engage in similar work, especially as it may be applied to arboriculture, Karl Sax was called from the Maine Agricultural Experiment Station in 1928, to be Associate Professor of Plant Cytology at the Arnold Arborteum. Some portion of his instruction will be conducted under the Faculty of Arts and Sciences.

Many of the most common and destructive plant-diseases are the result of parasitic attacks of other plants, chiefly of fungi. This subject, by no means previously neglected, has been specially presented since 1921 by William H. Weston, Jr. (A.M. 1912), who became Professor of Cryptogamic Botany in 1928. With much personal experience in the tropics as a Government expert in plant-pathology, and with detailed knowledge of the pests which threaten destruction of such valuable plants as the sugar-canes, coffees, and bananas, he has been able to give lucid and stimulating instruction in his subject, and has effectively directed the pertinent laboratory work, including difficult cultures of the minute organisms with which it deals. He has also given more general courses in other fields of cryptogamic botany.

In 1928 Joseph H. Faull from the University of Toronto was appointed Professor of Forest Pathology at the Arnold Arboretum, to conduct research and instruction on the diseases of trees and other woody plants. He will also give courses on this and related subjects in Cambridge under the Faculty of Arts and Sciences. Lincoln Ware Riddle (A.B. 1902), succeeding Thaxter in 1919, conducted in the College and Graduate School both elementary and advanced courses on the cellular cryptogams until his very promising career was terminated by untimely death. Assistant Professor Carroll W. Dodge (1924–27), called to Harvard from Brown University in 1921, has — in addition to his special services in relation to the Farlow Library and Herbarium — given several courses in cryptogamic botany, particularly in medical mycology.

From this brief review it will be evident that the botanical instruction at Harvard, in 1869 almost confined to a single field, has steadily expanded, keeping pace with the growth of the science, and now presents in creditable detail all the more significant aspects, both cultural and practical, of its branch of science.

2. The Botanic Garden

The Botanic Garden is among the oldest of Harvard's scientific establishments. Even in 1869 it had had more than half a century of development, and to judge from photographs must already have been a place of charm. Indeed, it seems to have had at that time more and finer trees than now, and to have been more bosky with scattered copses and masses of shrubbery. The land was full of springs, at the time but poorly drained, so there were three or four small ponds and a low moist spot ambitiously styled 'the bog.' The beds were already concentrically disposed about a small round pool near the middle of the Garden, but the plants were not systematically arranged, and few of them were labelled. Above the terrace stood several (then separate) buildings. These were the rather fine old

Georgian dwelling, belonging to the Garden and rented to Gray; next, a small story-and-a-half red brick building for the Herbarium; then, a few yards beyond, a conservatory some eighty or ninety feet in length, with a higher and slightly domed central portion for palms, tree-ferns, and the like; and lastly, at a greater distance, a cottage for the gardener.

Gray had already been in charge of the Garden for twenty-seven years, and desired relief. He had other and more important duties. His scientific eminence had made him a very busy man. In 1872 it was fortunately possible to secure in Sargent a person of exceptional capacity to take charge of the Garden. The following year he was appointed its Director, being the first to bear this title.

Under Sargent's energetic management (1872–79) great changes were effected. Duplicate trees and shrubs were removed, to afford space for more diversified planting. The exhausted beds were thoroughly worked over, and the planting, previously of an irregular nature, was reduced to a well-planned system. Special attention was given to complete and very clear labelling. The number of plant-species grown was increased from about 2000 to nearly 6000. During the last year of his service, according to Sargent's annual report, the exchanges of the Garden, both in plants and seeds, exceeded those of the Royal Gardens at Kew.

However, Sargent's special interest was in the development of the Arnold Arboretum, and he was soon relieved of his care of the Garden. His successor as Director of the Garden was Dr. Goodale. The choice was an excellent one and brought the establishment into much closer relations with classwork in the College. Goodale obtained the services of an exceedingly capable Scotch gardener, Robert Cameron, who had gained expert training in the service of the Kew Gardens. Planting was much improved, the conservatories rebuilt and much enlarged. Plants of rarity were obtained and cultivated with surprising success. To increase popular interest, special beds were planted to illustrate historic relations of plants to horticulture or to other human interests. Thus there was a bed to show the plants mentioned by Virgil and another containing those referred to by Shakespeare. In the hothouses special care was taken to grow species illustrating insectivorous habit, movement, pollination, and matters of physiological or morphological interest. In the upper part of the grounds an American garden was developed, to exhibit native species in appropriate habitats.

Not only in ways such as these did Goodale greatly increase the attractiveness and utility of the Garden, but he gave serious attention to its future, and it was through his fostering care that most of its existing endowment was acquired.

In 1909, after thirty years of effective service, Goodale resigned, and Oakes Ames, having already served eleven years as its Assistant Director, was advanced to the directorship of the Garden. He was able to add several features of interest as, for instance, a collection of fibre plants, and an under-glass rockery of porous stone adapted to the effective display of the smaller succulents and some of the alpine species.

About this time the Garden granted upon its premises facilities for several important researches by persons not immediately connected with its staff. Thus Dr. B. M. Davis, engaged in genetic problems concerning the evening primroses, was allowed space for his cultures. Experiments on the control of the gypsy and brown-tail moths were carried on at the Garden for the State Forester's Office. A laboratory was built at the end of the upper range of conservatories and used for research in plant-physiology. It was a time of manifold activities at the Garden.

Then came a tragic period in the history of the Garden, misfortunes crowding upon it in quick succession. Inflation incident to the Great War increased alarmingly its cost of maintenance. Its working staff had to be cut to a minimum. To save coal, some of its conservatories had to be abandoned. Cameron, its skilful and quite irreplaceable gardener, resigned in 1919. His successor proved not merely disappointing, but quite incompetent. An ice-storm damaged many of the trees.

After patient efforts to see the Garden through this time of difficulties, Ames, who was non-resident and closely occupied by duties of instruction as well as by personal enterprises of research and publication, felt obliged to resign, in June, 1922. Most unfortunately a new Director was not appointed for some months, and, the Garden, with much reduced staff and in the sole charge of a gardener far less competent than his predecessor, suffered rapid deterioration.

In June, 1923, Stephen F. Hamblin (S.B. Mass. Agric. Coll. 1912) was selected to take charge of the Garden and, in the following autumn, was appointed its Director. Highly trained in the theory and practice of horticulture, Hamblin saw at once much to do at the Garden, and immediately set about its reclamation with courage and energy. The exhausted soil of the beds was replaced and enriched. Weed-pests were vigorously fought, two of them having become veritable epidemics in the Garden: a very persistent little wild garlic and a gigantic Asiatic knot-grass. Ashes and other unsightly waste, which had accumulated through lack of sufficient labor to keep the service portions of the Garden in tidy order, were effectively employed in some regrading operations. A rose garden of considerable extent was planted, and particular provision made for herbaceous twiners. Annuals were planted in greatly increased numbers and the rockeries developed to several times their previous extent. New heating apparatus for the conservatories was installed, and the laboratory, no longer needed for physiological research, was converted into a far more convenient office than the Garden had previously possessed.

In these and many other ways the Director has brought back to efficiency an establishment which perhaps more than any other in the University had suffered from the changed economic conditions resulting from the War. Furthermore, every feasible effort has been made to enlist outside interest, especially on the horticultural side, and many generous contributions have been received, greatly reducing deficits which would otherwise have been overwhelming.

For more than a century the Garden has provided botany at Harvard with copious and varied material for class use; it has furnished space much needed for experimental cultures; it has been a readily accessible living museum of plant-forms. It has been one of the most decorative features of the University, and by the Cambridge public one of the most enjoyed. It has thus proved a notable means by which the institution could serve its community and extend popular education. As the city becomes more densely built, such open spaces will be increasingly valuable both for academic and for civic needs.

3. The Gray Herbarium

Few human achievements command so much attention or possess such romantic interest as exploration. Those who penetrate wild regions and brave great dangers, to gain knowledge of the topography, the plants, the animals, or the primitive inhabi-

GEORGE LINCOLN GOODALE

ASA GRAY

tants of regions not previously penetrated by civilized beings, are apt to receive much well-merited praise and sometimes an embarrassing amount of headline publicity. Furthermore, it is generally understood that such expeditions into the wild bring back 'collections,' and that these are of much interest and value; but the subsequent fate of these mysterious spoils is little known and rarely followed by the public.

Asa Gray was not himself an explorer, but by the time he had reached his thirty-second year and had been called to Harvard to be the first Fisher Professor of Natural History, he had become the most energetic and efficient botanist in America. During the subsequent forties, fifties, and sixties of last century, the western half of our continent was opened to extensive exploration. Many parties were sent out by the government to survey boundaries, map unexplored regions, or to take geodetic, meteorological, or other observations. A botanist accompanied many of these expeditions. Railroads also sent surveying parties through wild regions, and often equipped them for scientific collecting. Surgeons at western army posts often interested themselves in collecting specimens of plants, animals, minerals, and fossils. Thus during this period a vast and diversified territory was coming to scientific attention. Gray, as the recognized leader in American botany, received for study most of the plant-collections obtained by such expeditions, surveys, and pioneer observers in the west. It was he and his assistants who elaborated this vast material, and who named and gave scientific description to thousands of new plants that it contained.

In consideration of his eminent services, he was permitted to retain complete, or nearly complete, series of these plants. Therefore his herbarium became richer than any other American collection in what are called types, that is to say, specimens upon which new kinds of plants have been based, and from which their distinguishing traits were derived when their original descriptions were drawn up and published.

The scientific value of such type-specimens will be evident. They establish the identity of the plants they represent, and function as a kind of standard by which these may be precisely interpreted. The importance of an herbarium is largely determined by the number of types it contains. Thus it will be clear that Gray's herbarium had gained great scientific significance even before he gave it to Harvard College in 1864.

Gray, well understanding that the collection would have permanent and increasing value as a scientific asset of the institution, very properly made two conditions, namely, that it should be housed in a fireproof building, and that a fund should be raised to provide income for its support. Through the liberality of Nathaniel Thayer of Lancaster, and at a cost of about $12,000, a substantial building — fireproof according to the standards of its time — was provided, this being the first of Mr. Thayer's important benefactions to Harvard. By 1865 a fund of $10,550 had been raised by subscription as an endowment for the establishment. Gray estimated that his herbarium at the time of transfer contained about 200,000 specimens. These were mounted upon about 120,000 sheets, of which some bore two to five specimens each. With his herbarium Gray gave his exceedingly valuable botanical library. The same year John Amory Lowell (A.B. 1815) contributed an important collection of rare and sumptuous works on botany, many of them illustrated by hand-colored plates of high excellence — works which have since become excessively rare and which it would be impossible to replace.

Such was the Gray Herbarium in 1864, and, except for normal growth, such it remained until 1869, the date from which its progress is here to be treated.

The first addition to the housing occurred in 1870 when, through a gift (at the time anonymous) from Horatio Hollis Hunnewell, there were built a laboratory and small auditorium connecting the Herbarium with the conservatories. In the summer of 1879 there was added on the other side of the Herbarium a small wing for the library, which was connected with the study of the large frame house built in 1810 by Professor Peck, and occupied by Gray as a dwelling.

The rambling range of buildings thus connected, beginning near Garden Street with the dignified and hospitable Georgian residence of Gray and ending with the palm house of the conservatories, stood with little change until 1909. It is still affectionately remembered by scores of elderly botanists. It was a place of great enthusiasm and unwearied industry. Hither came explorers starting on perilous expeditions, or returning with their precious and dearly acquired collections. Here diligently worked men preparing floras of widely diverse regions, as, for instance, Horace Mann, Jr. (S.B. 1867), who in his short but brilliant career produced the earliest flora of the Hawaiian Islands; William Henry Brewer, engaged on his great Botany of California; Sereno Watson, to write up in scholarly detail the botanical results of the King Expedition to the Great Basin; John Merle Coulter, who produced the first comprehensive manual of the Rocky Mountain plants; William Trelease (S.D. 1884) and Liberty Hyde Bailey, pursuing monographic studies in difficult genera; Kingo Miyabe (S.D. 1889), completing his flora of the Kurile Islands. Here also worked many others, often as assistants, voluntarily giving their services or feeling liberally rewarded by the meagre salaries then current, coming in many cases from Gray's own pocket.

Noteworthy was the appointment of Sereno Watson as Curator of the Herbarium in 1874. He was a man of a fine dignity, both in appearance and manner, but painfully diffident and reticent. Though he had not entered the field of botany until middle life, he became extraordinarily diligent and methodical in its cultivation thereafter, so that in the eighteen years of his curatorship he produced many botanical works of a critical nature and great reference value.

Dr. Gray, relieved both of his instruction and of his curatorial duties, devoted himself to his long-deferred Synoptical Flora of North America, a work of such magnitude and difficulty that at his death (1888) he had been able to prepare and publish only about one-third of it. The work was continued by Watson, but progress became increasingly difficult. Botany in America was then rapidly expanding in scope. The subject was so well presented and diligently studied at many centres, that publications relating to it became copious.

Dr. Watson died in the spring of 1892. Only a year or so earlier he had selected for his chief assistants at the Herbarium Benjamin L. Robinson, trained at the University of Strasburg, chiefly in plant-anatomy, and Merritt L. Fernald, who at the University of Maine was already showing great promise as an original botanical investigator. On these two young men, both relatively inexperienced, was thus suddenly thrown the responsibility for the scientific work and further development of an establishment already of national importance in its field of research. Robinson, the senior of the two, was appointed Curator in the autumn of 1892.

The problems of the position were many, the chief of them being (1) the publication of Gray's and Watson's posthumous manuscripts in continuation of the Synoptical Flora, (2) the obtaining of a much larger endowment, (3) the revision of Gray's well-known Manual of Botany, (4) the procuring of a much larger, safer, and more convenient housing for the establishment, which, from the constant growth of its collections and library, was much congested, and (5) a more effective coöperation with other establishments in the exploration of both boreal and tropical regions. These ends, each requiring some years of close attention and unremitted effort and now in considerable measure attained, can here be summarized only in briefest outline.

Robinson made it his first object to care for the prompt publication of such portions of the Synoptical Flora as had been left in manuscript. In the rapid progress of science these were already in need of some editorial revision, and several important lacunae had to be filled. With the coöperation of Coulter, Trelease, and Bailey, he was able to complete and publish these manuscripts in two sections, which appeared in 1895 and 1897.

Until the middle 'nineties the Herbarium held, with respect to its support, a rather anomalous position. Though entered in the Treasurer's Report in the College accounts along with Appleton Chapel and the Hemenway Gymnasium, it was in no way financed by the College. The public, on the other hand, very naturally supposed the Herbarium to be a part of the Garden and supported by it. Yet it never received any income from that source, though the Garden with the utmost fairness shared with it such gifts for current expenses as were contributed by a joint Visiting Committee. In 1897 Goodale, then Director of the Garden and Botanical Museum and thus responsible for the still precarious support of both, decided that he could be of no further aid to the Herbarium, and requested that it might be provided with a committee of its own, and henceforth recognized as an independent establishment by the Governing Boards. That course was immediately taken.

This was the most critical period for the Herbarium. From interest on its fund and from diminishing returns on copyrights bequeathed by Gray, it had an income of about $3600, scarcely half the annual expenses, which could not be reduced without seriously damaging the interests of the scientific collections.

These matters were laid before the newly appointed Visiting

Committee, a strong and sympathetic group. Most of its members had been personal friends of Gray, or had studied in his classes. The Committee took immediate and helpful interest. By gifts for present use the existing difficulties were relieved. Attention was then turned to endowment in order to assure the future. Within a few months the Curator was able to announce to the Committee an offer (at the time anonymously made by Mrs. Gray) of the sum of twenty thousand dollars to endow an Asa Gray Professorship of Systematic Botany, a position to be united with the curatorship of the Herbarium. The offer was conditional on the raising of thirty thousand dollars as an Asa Gray Memorial Fund for the further endowment of the Herbarium. Somewhat more than this sum was raised by June, 1899, the proposed memorial professorship was founded, and Robinson was appointed as its first incumbent.

Cheered by this success, the Committee continued its efforts to increase the endowment; indeed it has never since remitted them. As a result, the permanent funds and reserve of the establishment have grown to about $345,000 — rather more than thirteen times the sum held in 1897. Of this notable advance in its resources almost two-thirds was received by bequest of Sarah E. Potter, for many years a sympathetic and generous member of the Committee. The obligations of the Gray Herbarium to this group of loyal friends during a very critical period in its development can scarcely be overemphasized.

A new edition of Gray's well-known Manual was being called for even before 1900. Professional and amateur botanists urgently insisted that this convenient and much-beloved handbook should be brought up to date and more copiously illustrated. The long and difficult task of its revision amounted to a virtual rewriting, for the plant-groups had to be thrown into a new sequence to bring them into accord with advances in phylogenetic knowledge; the scientific names had to be tested and revised in the light of newly determined international rules of plant-nomenclature; hundreds of newly recognized genera and species had to be interpolated; and about a thousand text-figures had to be prepared by good artists under close botanical oversight. Robinson and Fernald for nearly ten years devoted to this revision most of the time and energies which they could spare from pressing routine duties. In a few technical groups they had the needful collaboration of specialists. The revision was published in 1908, greatly extending the usefulness of this notable work.

By 1900 the need of larger quarters was evident. It was also felt that a union of the Gray and the Cryptogamic Herbaria would be desirable. At the suggestion of President Eliot, plans were drawn for a joint building to be placed near the University Museum. For nine years, efforts were made by Farlow and Robinson to enlist interest in this enterprise, but without success. By 1909 the congestion of the Gray Herbarium had become such as to endanger its collections and greatly impede its scientific work. As a last resort, it was decided to enlarge the existing building, but to make the addition one of such excellence that it would form an appropriate portion of a new building, should the reconstruction of the old one prove feasible. After years of discouragement it was an agreeable surprise to find this plan attracting immediate interest, especially on the part of the Visiting Committee. Friends of the establishment were gratified by the idea that the Gray Herbarium was to be preserved in the pleasant location with which it has always been associated, and where it had some manifest advantages not to be obtained in more closely built parts of the city. Mr. Nathaniel T. Kidder of Milton volunteered to bear the expense of the proposed addition, which has been appropriately called the Kidder Wing. It was devised with the utmost attention to simplicity and effectiveness, was built exclusively of incombustible materials and furnished in enamelled steel — a feature new in herbarium equipment. It was completed on time and, to general surprise, cost less than anticipated. It provided much convenient working space and caseroom for about three-fifths of the mounted sheets then in the Herbarium. The Kidder Wing attracted much favorable comment and at once became a stimulating example of what could be done by thrifty methods for the real safety of irreplaceable collections. Almost immediately Dr. George Golding Kennedy (A.B. 1864) offered to bear the cost of a similarly safe wing for the library, and Mr. George Robert White promised a wing suitable for laboratories of systematic botany. These were finished in 1912, bringing the composite structure to an amusing state, the little old building sinking to insignificance among the much taller wings by which it was nearly surrounded. Manifestly an enterprise so well advanced could not be allowed to lag at such a stage, and by a second gift from Dr. Kennedy it was possible to complete the middle section of the front portion the following year. Finally in 1915, the large central room was rebuilt, much increased in height, provided with a second gallery, and completely furnished in steel, this last building enterprise being rendered possible by gifts from Dr. Kennedy, Mr. White, Mrs. William G. Weld, Miss Susan Minns, and Mr. John E. Thayer, all of them members of the Visiting Committee.

Thus between 1909 and 1915 the Herbarium, through the liberality of its Committee, was provided with entirely new and greatly enlarged quarters. Rarely has it happened in any part of the world that a building has been erected expressly for an herbarium, and never, it is believed, with such freedom to give all possible attention to its special needs. The building set a new and much-advanced standard for herbarium housing and equipment. Many of its features have been copied elsewhere, particularly its steel cases, which have come into use at many other establishments.

From 1890 to 1912 much attention was given to the rich flora of Mexico and the problems of the Galapagos vegetation, Jesse More Greenman (S.M. 1899) effectively aiding the Curator in these investigations, while Fernald was already gaining surprising results in his exploration of the northeastern parts of America. After the revision of Gray's Manual and the rebuilding of the establishment, time and energy were released for new enterprises. War-time economic needs had indicated that the United States should have better reference collections for a proper understanding of tropical American vegetable resources, both medical and technical. Accordingly, the Gray Herbarium formed a coöperative alliance with the New York Botanical Garden and the United States National Museum, for a vigorous prosecution of botanical exploration in South America, by pooling resources available for such purposes. The plan proved gratifyingly effective. Well-equipped expeditions and experienced explorers have been sent to all the northern countries of South America and to each of the Cordilleran countries from Colombia to Chile. In a few cases other establishments have taken part. The results of these joint undertakings have been exceedingly satisfactory. Not only has much been accomplished which could not have been effected by isolated endeavor, but the coöperating establishments have been brought into closer relations of mutual helpfulness than ever before.

At the same time Fernald has been correlating efforts toward a better knowledge of the northeastern floras, enlisting in their study the coöperation of many botanists at several centres. He has personally engaged in repeated expeditions to the wildest parts of Maine, eastern Canada, Newfoundland, and adjacent Labrador. Among the many persons who have aided him in this notable work have been Professor K. M. Wiegand of Cornell University, Professor J. Franklin Collins of Brown, Professor Arthur S. Pease (A.B. 1902) of the University of Illinois,[1] and Mr. Bayard Long of the Academy of Natural Sciences at Philadelphia. In these northeastern explorations hundreds of new plants have been discovered, and very important and quite unsuspected phytogeographic relations have been demonstrated.

In 1903 the Herbarium agreed to take over the continuation of an important bibliographical work started (unofficially) at the United States Department of Agriculture by the librarian, Miss J. A. Clark. This was a card index, published in quarterly instalments and designed to include references to all American plants described since 1885. After its transfer to the Gray Herbarium, this arduous undertaking was long conducted by Miss Mary A. Day, for thirty-one years its exceedingly efficient librarian. After her death in 1923, it was put in charge of a special bibliographer, Miss Lesley C. Brown. The work has grown to large size (about two hundred thousand cards) and is recognized as one of the most important aids to research in its field. Though necessarily expensive, duplicate sets of this index have been acquired by about twenty leading botanical establishments, including those of four governments.

Since rebuilding it has been found possible to provide accommodation for the collections of the New England Botanical Club, thus bringing to the establishment the privilege of ready access to the important local herbarium of this energetic organization, a course which has done much to further the interests of both. There are few if any parallels for this course, in which the University has granted space to an outside organization to secure the advantages of proximity in allied undertakings.

The Gray Herbarium could not have accomplished the work here sketched had it not been for the unremitted diligence of an unusually talented corps of workers. This staff has always been small, rarely exceeding eight. Many of its members have been called to more highly salaried positions elsewhere, but others equally skilled have declined such offers and have remained long in the service of the establishment. Of these probably the most notable has been its collector, the late Cyrus Guernsey Pringle, in his field and of his period undoubtedly the most distinguished American explorer. Of the others, more than sixty in number, who have taken effective part in the scientific work of the establishment, it is impossible in our limited space to speak individually, nor can the very numerous publications of the Herbarium be here described.

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[1] Since President of Amherst College.

4. The Arnold Arboretum

James Arnold, a New Bedford merchant who died in 1869, gave by his will one and one-quarter of the twenty-four parts into which he divided his residuary estate 'To George B. Emerson, John James Dixwell and Francis E. Parker Esqrs. of Boston *in trust*: to be by them applied for the promotion of Agricultural, or Horticultural improvements, or other Philosophical, or Philanthropic purposes at their discretion, and to provide for the continuance of this Trust hereafter to such persons, and on such conditions as they, or a majority of them, may deem proper, to carry out the intention of the donor.'

Most men, if called upon to administer such a trust, would have yielded very naturally to scores of insistent appeals and would have apportioned its benefactions among several, or perhaps many, worthy enterprises. Happily the trustees selected by Arnold were men of insight and wisdom. They understood how temporary would have been the aid resulting from such division, but what lasting benefit might be accomplished if the sum — amounting to rather more than a hundred thousand dollars — were devoted to a single fairly specialized purpose, since in that way its income could be consistently spent with cumulative effect, and the resulting achievement be made a public boon of magnitude and enduring importance.

It happened that Emerson and Dixwell were both particularly interested in trees, the former being the author of a very scholarly work on those of Massachusetts and the latter having developed on his estate one of the best tree collections then existing in New England. This joint interest of two of the three trustees doubtless determined the policy of the group, for it decided to employ the legacy in the development of a scientific station for the study and cultivation of trees.

These trustees felt that such an establishment in Eastern Massachusetts would have the best chance of permanence and efficient scientific management under the care of Harvard University. Arnold's legacy was therefore legally transferred on March 29, 1872, to the President and Fellows of Harvard College. By a carefully drawn indenture the Corporation agreed to let the income on this fund accumulate until the sum reached $150,000, and then to devote the net income of the whole to the maintenance of an establishment to be known as the Arnold Arboretum, and to the support of a professor to be called the Arnold Professor, who should have the care and management of the said Arboretum.

By the same document it is agreed that the Arboretum shall be located on land in West Roxbury left to the University by Benjamin Bussey, and that it 'shall contain, as far as practicable, all the trees, shrubs, and herbaceous plants, either indigenous or exotic, which can be raised in the open air at the said West Roxbury, all of which shall be raised or collected as fast as is practicable, and each specimen thereof shall be distinctly labelled.'

It may be doubted whether the President and Fellows grasped the magnitude of the task assumed. However, their indenture states that 'as the entire fund, increased by the accumulations above named, under the best management and with the greatest economy, is barely sufficient to accomplish the proposed object, it is expressly provided that it shall not be diminished by supplementing any other object, however meritorious or kindred in its nature.'

The choice of an appropriate leader for the enterprise was a matter of crucial importance, and it may be counted as an outstanding instance of Eliot's insight into human character that he chose — presumably on the recommendation of Gray — Charles Sprague Sargent as the Director of the Arnold Arboretum. Sargent was then but thirty-two years old and, though a man of fine physique, great decision, and abundant energy, had neither manifested exceptional scholarship nor published a single scientific paper.

Appointed November 24, 1873, Sargent met with difficulties which, many years later, he described with characteristic irony:

> The prospect of being able to establish a useful institution would not have been encouraging if the men interested in it had had at that time as much knowledge as hope and enthusiasm. For it is safe to say that not one of them had an idea of what an Arboretum might be, or what it was going to cost in time or money to carry out the provisions of the indenture between the Trustees under Mr. Arnold's will and the President and Fellows of Harvard College; and certainly not one of them was more ignorant of the subject than the man selected to carry out the provisions of this agreement. He found himself with a worn-out farm, partly covered with natural plantations of native trees nearly ruined by excessive pasturage, to be developed into a scientific garden with less than three thousand dollars a year available for the purpose. He was without equipment or the support and encouragement of the general public which then knew nothing about an Arboretum and what it was expected to accomplish. The work of forming a nursery, however, was begun at once, greenhouses of the Bussey Institution being available for the propagation of the few plants which could at the time be found in the neighborhood of Boston.

By a very happy chance, there was at that time engaged in the development of the Boston park system a landscape architect of the foremost rank, Frederick Law Olmsted, whose genius enabled him to forecast far in advance scenic and horticultural possibilities, often in land which to others showed little promise. Olmsted immediately grasped the idea that an arboretum where the public could see varied plantations of rare and exotic trees and shrubs skilfully selected, artistically arranged, and grown under scientific oversight, would not only be an appropriate feature in the park system but might well become its culminating attraction.

Whether this idea of using the Arboretum as a restricted part of the park system originated with Olmsted or Sargent is not known; but in no event could it have been realized without the cordial coöperation of these two farsighted and dynamic organizers. Even in their capable hands the task had much difficulty. Neither the City nor the Harvard Corporation welcomed the idea. The press was indifferent, and the public apathetic. Nine years of persistent effort were required before it was possible to draft a plan of procedure acceptable both to the City and to the University and to secure its approval by the General Court of the Commonwealth.

The document signed December 30, 1882, by the City of Boston through its Park Commission and by the Harvard Corporation, is a model of care, and shows no small ingenuity. In briefest outline, it embodied the following provisions. The City acquired from the College full title to the ground then held by the Arboretum and agreed to lease the greater part of this land (together with some adjacent tracts) to the College for one thousand years for the purpose of an arboretum and at the nominal rent of one dollar per year. The right of renewal for another thousand years was also guaranteed.

In thus leasing back to the College the land acquired from it, the City reserved to itself such portions as were deemed necessary for parkways and drives. It further assumed responsibility for the making, care, and policing of these roadways, agreeing to complete them within a reasonable time and at its expense provided that did not exceed $75,000. The City also guaranteed certain aid to the Arboretum in the matter of water supply. On its side, the College agreed that the Arboretum should be at all reasonable times open to the inspection of the public as a part of the park system. On both sides, there were some qualifying provisions, restrictions, and appropriate rules of procedure, all duly set forth in this noteworthy document.

Prior to the middle 'eighties little could be accomplished in the permanent planting of the Arboretum. Available income had been lacking until its capital had reached the sum of $150,000. There had also been some unexpired life-interests under the Bussey will on portions of its land, which precluded their immediate use. Even after the legal status of the Arboretum as one of the Boston parks had been established in 1882, the City was slow in building the driveways. Finally the original allowance of land from the Bussey estate which had been granted by the President and Fellows to the Arnold Arboretum proved inadequate for the ambitious programme which had been undertaken.

To meet the need of more land, the City purchased two adjoining estates, together containing about eight acres, and annexed them to the Arboretum, and the President and Fellows allotted to the Arboretum in 1894 an additional seventy-five acres of land called Peter's Hill. This, like its original tract, had been a part of the Bussey land, and its transfer to the Arboretum became a matter of some delicacy owing to rival claims of the Bussey Institution. Subsequently, some smaller tracts were acquired for the Arboretum by subscription, bringing its area to approximately two hundred and sixty acres.

The problems of the Arboretum in its early years were many and great. Though its land appeared inadequate for its ambitious scheme of planting, its area was quite large enough to make such needs as fencing, drainage, regrading, planting, watering, spraying, and the like, matters of appalling magnitude in relation to its income. Furthermore, its status being that of a public park, there was special obligation to keep it neat and presentable in all parts and at all times. The very prospect of its permanence added difficulty to procedure, for each feature had to be determined with the utmost attention to its lasting effect.

The land of the Arboretum is charmingly diversified. It includes meadows of considerable extent, hills commanding wide views, a brook of sufficient size to form a scenic feature, some small ponds, many well-grown native oaks and other trees over a century old, and a bold and picturesque rocky cliff known as Hemlock Hill, covered with a mature, dense, and almost pure stand of hemlock.

The planted trees have been arranged by families and genera, and these disposed in an essentially natural sequence, though of course this order can neither be rigidly maintained nor follow changes in phylogenetic theory. Hardy shrubs of genera not represented by trees are disposed in the same sequence, and in parallel beds ten feet wide and with a total length of 7765 feet. This shrub collection is near the Forest Hills entrance and is bounded by a trellis for climbing species.

So far as practicable, each specimen planted is given a small metal label, with a number corresponding to the one under which in a card catalogue its origin and history are recorded. Besides these small indicators, larger and very clear labels are freely used to show the public the Latin and English names as well as the native countries of the specimens cultivated.

The regions particularly represented by the living collections are the cool temperate parts of North America, Europe, and Asia. No plants of the Southern Hemisphere have proved hardy at the Arboretum. The number of species and varieties of trees and shrubs growing at the Arboretum in 1922 was estimated by Sargent at between five and six thousand.

This great number has been patiently assembled, in small part by purchase and exchange, but chiefly as the result of repeated and indefatigable expeditions of the Director and his assistants to the most widely scattered parts of the world. A remarkably good start was made during the years in which Sargent, as agent of the United States Government, studied and recorded the forest wealth of the country for the Tenth Census. This enterprise took him personally to all its more important forested areas, and brought him into touch with a great number of persons interested in timber enterprises who have proved exceedingly helpful in the acquisition of specimens and information.

In all his work Sargent kept in mind its horticultural possibilities. The testing of woody plants in relation to climate has been going on at the Arboretum from the start, with the purpose of discovering kinds which had not previously been in cultivation but which would prove helpful components in decorative planting. In this the Arboretum has been wonderfully successful. By 1922, according to its records, no less than 1286 kinds of woody plants had through its agency been brought for the first time into cultivation.

Though extensive collections for this purpose were made in various parts of North America, Europe, and Siberia, it early became evident that the most promising regions for such discoveries of horticultural interest were, from climatic considerations, Japan, Korea, and the cooler parts of China.

Sargent personally visited Japan in 1892, and early established exchange relations with the botanists there. In Ernest Henry Wilson, now Keeper of the Arnold Arboretum, Sargent found an explorer of the highest ability, who for years travelled extensively in the interests of the establishment, especially in Western China, discovering and obtaining seeds or living specimens of a great number of species and varieties never previously brought into cultivation, many of them wholly new to science. Similarly, Mr. Joseph F. Rock, a skilled and intrepid collector, was employed on extensive explorations of gigantic mountain ranges of Northwestern China and Northern Tibet, where he secured, in addition to much other material, many rhododendrons of great beauty and value.

On the botanical side also the work of the Arboretum has been of great extent and importance. Between 1890 and 1902

Sargent published a Silva of North America in fourteen sumptuously printed folio volumes. In this work each species and variety of tree known to grow on the American Continent north of Mexico was beautifully illustrated and described, not merely as to botanical character but with the addition of much historic, technical, economic, and statistical information. The plates for this work, 740 in number and illustrating no less than 585 trees, were drawn by Charles Edward Faxon (S.B. 1867), one of the most skilful and prolific botanical artists the world has ever seen. Faxon also prepared much of the text, especially the admirably detailed bibliographical portions. In 1894 Sargent published his Forest Flora of Japan, a folio volume, in form and illustration somewhat like his Silva. From the Arboretum have also come two very useful handbooks, Sargent's Manual of the Trees of North America (1905), and a Manual of Cultivated Trees and Shrubs (1927), by Alfred Rehder, who for more than thirty years has been engaged in scholarly work at the Arboretum and is now the Curator of its herbarium. George Russell Shaw (A.B. 1869) published from the Arboretum in 1909 his Pines of Mexico, and in 1914 his Genus Pinus, both admirably illustrated works. From 1913 to 1917 there appeared under the editorship of Sargent three large volumes called the *Plantae Wilsonianae*, a work putting on scientific record the many botanical and horticultural discoveries of Wilson.

Notable have been the great extent and useful nature of the bibliographical work accomplished at the Arboretum by Rehder. The publication of this in five stout quartos, known as the Bradley Bibliography, has been financed by a gift received in 1897 from Miss Abbey A. Bradley, to perpetuate the memory of her father, William Lambert Bradley. The first and second of these deal with dendrology, the third with arboriculture, and the fourth with forestry, while the fifth provides a general index of authors and subjects mentioned in the preceding volumes.

Of the also copious incidental and serial publications, both popular and technical, which have come from the Arboretum, it is impossible from lack of space to speak here.

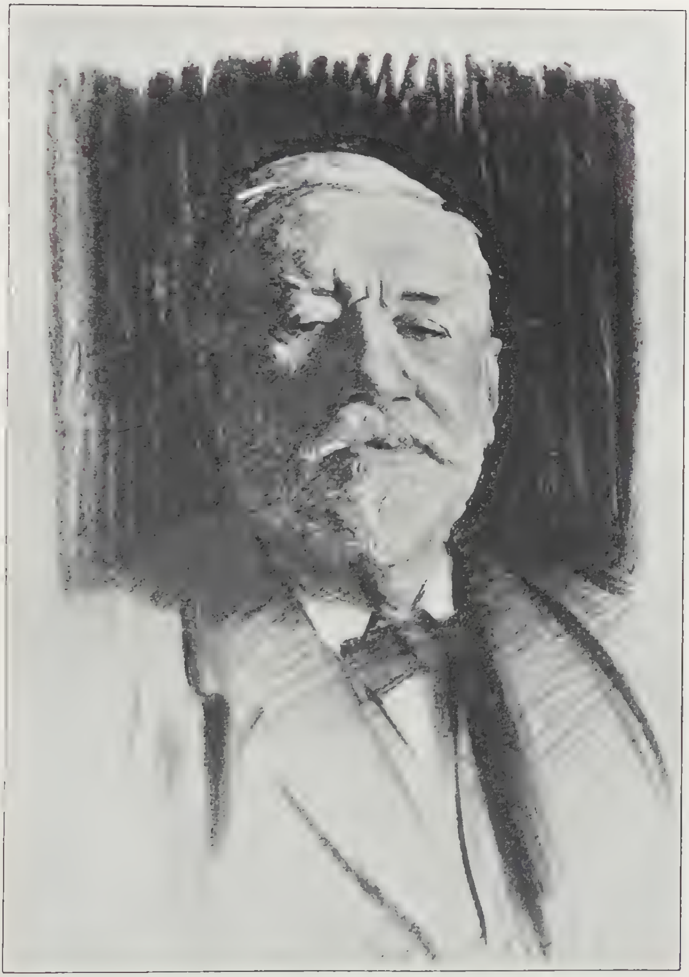
For some years Sargent devoted much attention to the hawthorns, a group of unsuspected extent and baffling difficulty. Taking a somewhat optimistic view of possibilities and availing himself of the most detailed differential traits, he distinguished upward of a thousand species and varieties, of which considerably more than half were originally described by himself. Of these puzzling little trees and shrubs many, on account of fine foliage, copious spring flowering, or bright autumnal fruit, have decorative value. They have been cultivated at the Arboretum in great number, and constitute a unique specialty of the establishment.

In the early years of the Arboretum its office, herbarium, and library were kept in a house in Brookline. In 1892, through the liberality of Horatio Hollis Hunnewell, a brick building of admirable quality was erected near the Jamaica Plain entrance and became the official headquarters of the establishment; to it were moved its library, records, and dried specimens. In 1905 a four-storied fireproof wing was added for the herbarium.

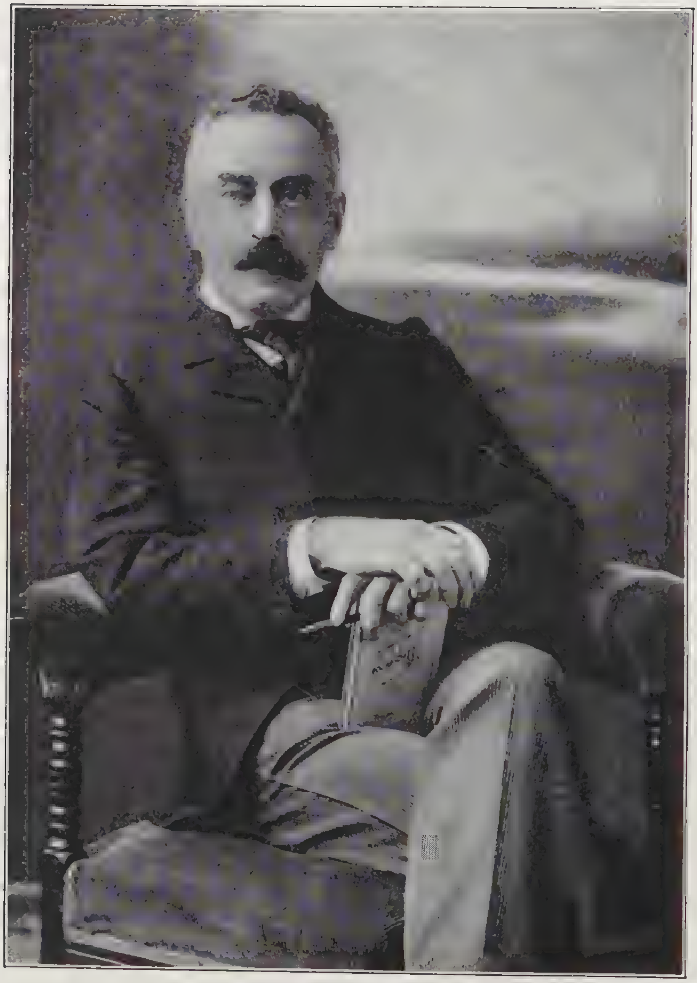
It had been early realized that the work of the Arboretum could not possibly be carried on with accuracy without an herbarium. The living collections had constantly to be checked as to their identity, by comparison with carefully determined dried specimens. The beginning of this needful reference collection was made by John Robinson of Salem, who was its Curator from 1878 to 1882. Then Faxon took charge of the herbarium. During his care, which extended through some thirty-six years, it grew very rapidly, receiving constant additions as a result of extended collecting journeys of Sargent, Jack, Rehder, Wilson, and other members of the staff. On the death of Faxon in 1918, Rehder was appointed its Curator. It has become by far the largest herbarium of woody plants.

The Administration Building contains also a valuable collection which was the gift of the late Morris K. Jesup, and which, in cases appropriate to their preservation and display, illustrates the wood and bark of most of the trees of the United States.

The library of the Arboretum was from the beginning a special interest with the Director. To it Sargent devoted much thought, and upon it he spent liberal sums. It is to-day unique as an assemblage of literature relating to the woody plants in all their aspects. It has been fully catalogued and admirably arranged by Miss Ethelyn M. Tucker, a member of the Arboretum staff from 1904, and its Librarian since 1918. In 1914 and 1917 a detailed catalogue of the library, compiled by Miss Tucker, was published in two closely printed quarto volumes.



CHARLES SPRAGUE SARGENT



WILLIAM G. FARLOW

Sargent died in 1927. By great capacity and continuous devotion to the Arboretum during an administration of more than half a century, he had brought it from unorganized beginnings to unrivalled extent and perfection. Perhaps the gift which contributed most to his success was his ability to enlist for the establishment the devoted services of official subordinates of high talent. Many of these have already been mentioned, but no account of the Arboretum, however brief, would be complete without record of its indebtedness to Jackson T. Dawson, the invaluable English gardener, expert in all matters relating to the nurseryman's art, who for more than forty years tended its plantings.

Even in his will Sargent took the long view regarding the destiny of the Arboretum. Leaving twenty thousand dollars for the support of its library, he added a further sum of ten thousand, which is to be allowed to accumulate at compound interest for one hundred years. At the expiration of this period, half the resulting fund may be employed in the care of the Arboretum, but the remainder is to be permitted to accumulate for another century.

In 1927 Oakes Ames was made Supervisor of the Arboretum, as well as of some other botanical establishments of the University. Sargent had been able to secure for the Arboretum the interest of many friends, and it was wisely felt that, with the passing of his personal influence toward gifts for immediate use, there would be need of much larger capital. To this end well-correlated efforts have been made, taking for their goal a million-dollar Charles Sprague Sargent Memorial Fund. This aim has been gratifyingly achieved, probably no department of the University possessing wider publicity or greater powers of attracting favorable attention to its needs.

The newly obtained additions to its resources have permitted several promising supplementary activities, long projected by Sargent himself, namely, expert attention to plant-genetics and phytopathology in relation to woody plants, the former being now represented by Professor Sax and the latter by Professor Faull, additions to the staff by which the Arboretum becomes even in fuller measure a well-rounded institute of dendrology.

5. The Farlow Library and Herbarium of Cryptogamic Botany

So numerous are the cellular cryptogams and so specialized is the technique of their investigation that the study and care of these lower groups (the fungi, algae, lichens, hepatics, and mosses) have long required special staff, laboratories, collections, and literature. It is to Farlow that our University primarily owes its now invaluable equipment in this field, and it is highly appropriate that the resulting institute has become in name as well as fact a memorial to his life-work. As already stated, Farlow was an influential leader in the teaching of his subject. Through his long professional career he was even more diligently occupied in the upbuilding of reference collections of great completeness and distinguished excellence.

Early in 1873, while still studying in Europe, Farlow arranged with Gray for the purchase of the valuable mycological herbarium of M. A. Curtis, who had collaborated with the famous English mycologist, M. J. Berkeley. This collection contained numberless authentic specimens and parts of types, on which most of Berkeley's numerous papers on American fungi were based. It also included original material from Schweinitz, Fries, De Notaris, Desmazières, Duby, and other mycological pioneers. The Curtis Herbarium, together with the considerable collections, especially of algae, already gathered by Farlow himself, formed the basis of the Farlow Herbarium as it exists to-day. For some years these cryptogamic collections were the private property of Farlow, but after his appointment as Professor of Cryptogamic Botany in 1879, when he was transferred to Cambridge, they were, with certain conditions, made over to the University, which agreed to assume part of the expense of their maintenance and increase.

The history of the Herbarium is one of continuous growth during the remaining forty years of Farlow's life, both through his own discriminating and indefatigable collecting, especially in New England, and through contributions from his students and correspondents all over the world. This gradual development was punctuated from time to time by acquisitions of major significance, herbaria of specialists in some cases comparable in importance to the Curtis Herbarium itself. Thus the herbarium of Edward Tuckerman, which, being extremely rich in types and authentic specimens, forms by far the most important basis for knowledge of American lichens, was purchased by subscriptions in 1888, shortly after Tuckerman's death. Bryological material was transferred from the Gray Herbarium in 1899 and included several exceedingly important collections: (1) the herbarium of W. S. Sullivant, received by bequest from this eminent bryologist, who died in 1873; (2) that of T. P. James, co-author with Leo Lesquereux of their classical Manual of North American Mosses; (3) the hepatic herbarium of Thomas Taylor of Dublin; together with much other bryological material of value. The fungi brought together by J. B. Ellis during the last four years of his life, as well as the set from his main herbarium which he had reserved for his collaborator B. M. Everhart, consisting largely of types and parts of types, were purchased in 1904, together with other *reliquiae* of Ellis.

One of the most important features of the Herbarium is its assemblage of so-called *exsiccatae* or published sets of dried fungi, algae, lichens, or bryophytes. These are issued, always in a small edition, by specialists. Many of these sets, which are almost indispensable for the precise determination of the plants they illustrate, are now excessively rare and could not be replaced.

Having migrated with Farlow from the Bussey in 1879, the Cryptogamic Herbarium, after brief sojourns, first in Lawrence and then in Boylston Hall, enjoyed, through the courtesy of Alexander Agassiz, the hospitality of the Museum of Comparative Zoölogy until the completion, in 1890, of the Botanical Section of the University Museum, where quarters were provided for it on the top floor. Here it increased rapidly, and at the time of Farlow's death, in 1919, contained in the general collection between one and two hundred thousand specimens, besides an almost equal number in the *exsiccatae* and the large special herbaria of Curtis, Tuckerman, and others, above mentioned. From that date these joint collections, under the happily chosen and now widely known name of the Farlow Herbarium, have been in the care of Thaxter and Dodge, the latter having been called to Harvard primarily for the supervision of the Farlow Library, but in 1927 appointed Curator of the Farlow Library and Herbarium.

In 1923 the Farlow Herbarium was removed from the Botanical Museum and placed in an adjacent building formerly occupied by the Divinity School Library, where a fireproof wing, equipped with modern steel cases, was provided by subscription for its preservation. In recent years several notable additions have been made by purchases rendered possible largely through the unfailing interest and generosity of Mrs. Farlow. Among these the mycological herbaria of the late Professor von Hoehnel of Vienna and M. Patouillard of Neuilly have special value and historic interest. The former, received in 1922, included between forty and fifty thousand specimens and preparations; the latter, received in 1927, contained an even greater amount of original and critical material. The mycological herbarium of Father Theissen, smaller but rich in Brazilian forms hitherto unrepresented in our collections, was secured in 1928. The lichen herbarium of G. K. Merrill, — at the time of his death the most prominent lichenologist in this country, — comprising about fifty thousand specimens, was purchased in 1927. The bryophyte collections have been enriched (1) by the 'Miniature Herbarium' of Stephani, one of the foremost students of the *Hepaticae*, whose thus-styled special reference collection comprised about thirty-five hundred largely authentic or typical specimens; and (2) by specimens from the moss-herbarium of the late E. B. Chamberlain, bequeathed to the New England Botanical Club, but, so far as extra-limital to its activities, presented by the Club to the Farlow Herbarium in 1926.

Special exploring activities and collecting enterprises encouraged by the Herbarium have been carried on by members of its staff, or coöperating correspondents, in Costa Rica, Panama, British Guiana, Brazil, widely separated parts of tropical Africa, and the Chinese province of Fukien. Finally, the usual and more gradual growth of the Herbarium by gift, exchange, or smaller purchases has been maintained.

Publications, based on the Harvard cryptogamic collections or resulting from research in the associated laboratories, already include more than a hundred octavo 'Contributions' by members of the staff and advanced students. At longer intervals there has also been a series of admirably illustrated quarto 'Memoirs,' presenting, among other technical subjects, the brilliant discoveries of Thaxter regarding fungus parasites of insects, a special field of research which he has long cultivated with unrivalled success. Probably the most widely used of Harvard's cryptogamic publications have been Farlow's Marine

Algae of New England (1881) and his Host-Index of North American Fungi, compiled in collaboration with Arthur Bliss Seymour (1888–91). Of the latter, a greatly enlarged reissue, prepared by Seymour, is now (1928) in press. The *Icones Farlowianae*, a sumptuous work on the rarer American fleshy fungi, for which over a hundred beautifully colored lithographic plates were completed many years ago under Farlow's supervision, is being issued with text prepared by Professor Edward A. Burt (A.B. 1893). A bibliographical card-index was early begun by Farlow. Continued by Seymour for more than thirty years, it has grown to huge size and contains all essential references to the literature of American fungi. In 1905 a single volume of more than three hundred pages, but including only the letter A of this great index, was published by the Carnegie Institution. The work has now reached proportions that make its further publication unhappily problematic. Under the title *Reliquiae Farlowianae* there have been issued sets of *exsiccatae*, each containing eight hundred and fifty specimens of fungi, lichens, and bryophytes, for the most part assembled by Farlow for exchange.

Although Farlow's library did not become the property of the University until 1922, its importance in academic work dates from his appointment in 1874. Its subsequent development was rapid and continuous, especially as the importance of cryptogamic botany in applied science was increasingly grasped, and publication became voluminous. Farlow spent a considerable fortune to make his library in its field as complete as possible. Many of the earlier works, particularly those relating to the fleshy fungi, had hand-colored plates, or for other reasons had been issued in small editions. They were apt to be promptly absorbed in large and permanent libraries, thereafter coming on the market so rarely as to command well-nigh prohibitive prices. During more than forty years Farlow personally searched through practically every catalogue likely to contain quotations of these scarce and specialized works. He was very discriminating, but quickly chose his orders and never hesitated to cable them when competition seemed probable. Thus in his subject he acquired a completeness of literature rivalled only, and in no case much exceeded, by the oldest and largest botanical establishments of Europe.

After Farlow's death, though provision had been made for his herbarium by the J. S. Farlow Memorial Fund, no means were available for the care and increase of his Library, and for several years no additions were made except that the more important periodicals were privately renewed by Mrs. Farlow. The Library had been bequeathed to the University on condition that within three years it should be provided with fireproof quarters in immediate proximity to the Herbarium. About this matter there was great and very trying delay. In April, 1922, within three months of the time limit, the Divinity School Library building having been assigned to Cryptogamic Botany, permission was at length given to solicit funds for the fireproof addition above mentioned, where the Herbarium could be safely housed and the disused Divinity Library stack could be installed for the Farlow Library. The necessary funds were quickly obtained, and construction begun the following summer. Changes essential to safety having been made also in the older part of the building, the Herbarium and Library were moved to their new quarters early in 1923.

Though the terms of the Farlow will were thus met, the University felt unable to assume expense for the care or development of the Library. Here again Mrs. Farlow saved the situation by providing an endowment, later doubled by her bequest, for the increase of the Library. Through the similar generosity of one of his former students, a W. G. Farlow Memorial Fund makes corresponding provision for the administration of the Library.

Since 1924 the most important single acquisition has been the mycological library of the late Professor F. Bucholtz, which, among other accessions of value, brought about seven hundred and fifty new titles of much-needed Slavic literature. The Library is fully catalogued, provided with a reading room, and supervised by a competent librarian. It has developed broad exchange relations and is, in its field, widely known and constantly consulted both personally and by letter.

6. The Botanical Museum

As early as 1858, Gray wrote to his friend Sir William Hooker, then Director of the Royal Gardens, 'I must tell you that in humble imitation of Kew I am going to establish a museum of vegetable products, etc., in our University.' This collection, in the aid of which he bespoke such duplicate material as could be spared from Kew, was doubtless intended primarily for morphological illustration in teaching, — an affair of wood-samples, pods, cones, nuts, burls, palm-trunks, witches' brooms, monkey-pots, and the like, — a valuable aid to instruction, but little suited to public exhibition. For some years the collection grew with fair rapidity, but in desultory manner. In the early 'seventies it was kept, together with some physiological apparatus, in a range of tall and by no means dust-proof glass cases in the Hunnewell Laboratory at the Botanic Garden. Later most of the objects it contained were transferred to Harvard Hall, to be more readily available for class use. Here it not only threatened to encroach on the cramped laboratory space then allotted to botany, but, if tradition be credited, some of its rare but grotesque objects proved far too tempting to students and were apt to roll mysteriously down aisles and stairways, giving incident to otherwise unexciting lectures. Every teacher of general botany well knows the type of material, and has experienced the impossibility of keeping it in neat condition or in proper relation to labels.

About 1878, the care of this collection was added to Goodale's many duties. With his gift for organization, he not only reduced it to much better order, but saw in it the germ of something large and fine. He felt that such an assemblage, freed of casual elements and constructively developed along economic lines, might function both as illustrative material for the teacher and as a reference collection to which even the specialist might turn for much-needed information — a place where rare drugs could be identified or unusual fibres compared. The ideal was not a new one even in those times, but had never been satisfactorily realized. Goodale was confident that such a museum could be made successful. He was sure also that, with ample space and good light, with appropriate exhibition cases and explanatory labelling, many of its exhibits could be made attractive to the public, especially if supplemented by photographs, paintings, and realistic models.

With such ambitions it was natural that Goodale entered readily into the plans which, in the middle 'eighties, were maturing, under guidance of Alexander Agassiz, for the further development of the great University Museum, of which only the Zoölogical Wing and part of the Peabody Museum had been completed. The next logical step was clearly a botanical section. The need and possibilities of such a structure were so convincingly placed before interested friends by Goodale, that sufficient funds were soon available, and this particular building enterprise was completed in 1890. It provided a structure of five stories and basement. It offered large floor space and relative security. Without being fireproof, it is 'mill-built' in the manner of the rest of the great structure of which it forms a part. From the start this section has been called the Botanical Museum, though much of its space was appropriately devoted to laboratories, auditoriums, and private offices of the instructing staff.

After consultation with Agassiz, Goodale planned a synoptic room as a feature of the Botanical Museum. It was to parallel for plant life a similarly ordered display of animals in the Zoölogical Section. Dried plants, it was true, would not lend themselves to such display in the manner of mounted animals, yet Goodale was confident that some form of realistic representation of plant-life would prove feasible, though he was obliged to admit that such attempts at plant and flower models as were being tried at European museums, in clay, paper-pulp, or wax, were much too clumsy or perishable for his purpose. A little before this time the Museum of Comparative Zoölogy had acquired a few exceptionally delicate models done in glass. They represented jellyfish and other marine invertebrates, reproducing their slender tentacles and elusive tints with remarkable fidelity. An examination of these models led Goodale to infer that glass might yield the desired medium, and he at once got into communication with the makers, Leopold and Rudolph Blaschka, father and son, artists in glass at Meissen, near Dresden.

The Blaschkas were at first reluctant to undertake the modelling of plants, though it appeared that the father had already, more than twenty years earlier, prepared for the famous orchidologist Reichenbach about sixty models of orchids, a collection unhappily lost in a fire which in 1868 destroyed the museum at Liège. After some negotiation the artists at length consented to prepare a few samples. These were forwarded to America in 1887, and, although seriously damaged in the New York Custom House, reached Cambridge sufficiently intact to show great promise. Convinced of the desirability of using glass for the synoptic room models, Goodale put the matter before friends of the Museum. Mrs. Elizabeth C. Ware and her daughter Miss Mary L. Ware became deeply interested in the project and authorized preliminary work at their expense. Subjects were carefully selected to show species characteristic of the leading plant-groups. At first the Blaschkas agreed to accept only a half-time contract, desiring also to continue their output of zoölogical models; but in 1890 they reported that it was scarcely feasible to divide their attention between the two classes of objects. Therefore it was found expedient to arrange a ten-year contract for their whole time. Mrs. and Miss Ware financed the undertaking very liberally, and the artists resumed their work with new zest from the knowledge that their output could thus be given unprecedented extent and excellence. On April 17, 1893, the collection was officially presented with appropriate addresses, before a distinguished gathering, to the President and Fellows of Harvard College, as a memorial to Dr. Charles Eliot Ware (A.B. 1834). The contract with the artists was renewed several times, and for no less than forty-one years the entire output of their studio was obtained for the Botanical Museum.

The collection includes several thousand models. The greater part represent plants and flowers in their natural size and with astonishing accuracy of form and color. There are also some much-enlarged parts to show morphological features or even histological details. Models have likewise been ingeniously devised to illustrate insect pollination and the traps of insectivorous plants.

As a popular exhibit the collection has had remarkable success. Its presence has greatly increased, indeed practically doubled, the number of visitors at the Museum, records showing that in the course of a year as many as two hundred thousand persons have come to view this particular collection.

Having secured a central feature of such drawing character, Goodale made it his next care to group in adjacent rooms a great variety of natural objects, with clear explanatory labels, and often accompanied by photographs, paintings, or transparencies, of a nature to convey information regarding plant-life. As the other botanical establishments of the University were devoting attention chiefly to plants as they occur in the wild, he clearly saw that the Museum might most happily supplement work done elsewhere if it gave special prominence to the economic side of botany, and represented in particular detail the relations of plants to the needs of man. To this end he both devised a great variety of popular exhibits and formed, as material for scholarly research, reference collections to show as far as feasible the botanical facts relating to drugs, fibres, beverages, sugars, condiments, and the like. Fruits and nuts, of both temperate and tropical regions, were also illustrated by samples, models, or colored plates. Even their diseases have been shown by some exceedingly realistic models in wax, prepared in Japan.

One of the most valuable possessions of the Museum is its collection of fossil plants. The nucleus of this was a considerable quantity of vegetable fossils assembled by Louis Agassiz, and transferred in 1890 to the Botanical Museum by Alexander Agassiz. Many of them are priceless, being types or specimens critically studied and described by Lesquereux and other great specialists. Few of these fossils lend themselves to exhibition. Most of them are kept in a well-ordered research collection preserved in the basement in trays supported on substantial racks suited to their often considerable weight. The collection has been from 1890 in charge of Dr. Robert Tracy Jackson, under whose expert management it has attained high rank among American collections of its kind.

In 1890 and 1891 Goodale made a journey around the world largely in the interests of the Botanical Museum. He was able to secure by purchase or gift many exhibits of rarity, was successful in arranging wide exchange relations, and formed contacts with a host of industries able to contribute interesting samples of vegetable products. In 1909, after long and effective service, Goodale retired from most of his official duties, but accepted the position of Honorary Curator of the Botanical Museum, and until his death in 1923 continued to give attention to its development, its wide correspondence, and particularly its financial support, the establishment being still wholly unendowed.

In 1923 Oakes Ames was appointed Curator of the Botanical Museum, and in 1927 made its Supervisor. The choice was admirable. Ames brought to his duties experience resulting from many years of particular attention to economic botany. He had already built up at the Bussey Institution reference collections of great extent and most careful organization. These were transferred to the Museum, where they notably supplement the previous resources of the establishment. His extensive library on economic botany, though his personal property, he has generously placed at the service of the Museum, where it is conveniently shelved and accompanied by several carefully elaborated and exceedingly ingenious card-catalogues and bibliographical indices, which give quick reference to the huge technical literature relating to the plant-industries. Ames also permits the Museum to keep on temporary deposit his invaluable herbarium of orchids, a group in which he is America's leading specialist.

The new management of the Museum has made appropriate efforts to assure the future of the establishment, and these have already met with generous response. In 1924 two commemorative gifts of fifty thousand dollars each were received, and form a gratifying basis for the desired endowment. The first, from an anonymous patron, was given to create a George Lincoln Goodale Fund, its income to be available for the Botanical Museum. The other, from Miss Susan Minns of Boston, forms the Mary Hancock Fund, with income to be used for economic botany at the Botanical Museum.

The Botanical Museum has from the first generously supplied the College with laboratories and lecture rooms for use in botanical instruction. Among these a large and excellently appointed auditorium was the special gift of the late Nathaniel Cushing Nash (A.B. 1884). Of the botanical equipment as it exists at the University to-day probably the laboratories are the least adequate and satisfactory part. While the botanical establishments have been advancing rapidly with the times, the College, relying upon their prestige, has let its laboratories lag somewhat behind standards attained elsewhere. Happily by a munificent gift from the General Education Board, announced in June, 1928, the University is to have a biological building of large size and of highly perfected equipment, to which, so far as practicable, biological instruction will be moved from all parts of the University. This will free most of the laboratories at the Botanical Museum, where the space they have occupied, duly renovated, will be grateful for the expanding activities and collections of the Museum itself.

With display material of such popular interest, with reference collections so valuable for the study of plant-products of the utmost importance to mankind, with substantial housing and well-laid foundations for needful endowment, the Botanical Museum presents a singular contrast to the miscellaneous assemblage of illustrative material turned over to the care of Goodale in the late 'seventies.

7. The Biological Laboratory and Botanic Garden in Cuba

The rigorous climate of New England locally precludes many forms of experimental planting, but as early as 1898 a project was evolved for a Harvard station in Cuba, where well-nigh ideal conditions for these could be found. As a result of some preliminary plans, an agreement was reached in 1900 between Mr. Edwin F. Atkins of Boston and the Harvard Botanic Garden, represented by Goodale and Ames. Mr. Atkins agreed to supply labor, materials, and money needful to equip on his Cuban estate near Soledad an experimental garden, where, under the direction of the Harvard Botanic Garden, a variety of problems relating to tropical agriculture might be studied from the scientific point of view and under the most favorable conditions.

The undertaking was entrusted to the local management of Robert M. Grey, an experienced plant-breeder. As his initial task, he took up the hybridizing and selection of sugar canes to increase their yield and their resistance to disease. It should be explained that the sugar canes can be crossed only by methods requiring the greatest skill and patience. This work was aided so far as possible from Cambridge. Thousands of plantings were made, representing a great variety of hybrids between local stock and canes from Jamaica, Barbados, Demerara, and elsewhere, and several strains of superior merit developed.

Soon the activities of the station were extended to many other tropical crop-plants, which could be there grown under close observation and subjected to intelligent selection. For comparative study or experimental purposes many species of decorative or special biological interest have been added to the plantations.

The enterprise in all its stages has been liberally financed by Mr. Atkins, and its continuance has been assured by his gifts to the University now assembled as the Atkins Fund for Tropical Research in Economic Botany. The station is proving helpful also to the Harvard zoölogists, and provides a well-established and healthfully situated base for tropical and subtropical biological observation and experimentation. At present it is directed by Dean Wheeler of the Bussey Institution, Professor Ames, and Dr. Barbour.

We have described, so far as our space will permit, the manifold activities of Harvard University during the last sixty years in this great field of natural science. Botany, under our very eyes, has unfolded in ways unknown, even unsuspected, in 1869. These new developments, in many of which Harvard botanists were the American pioneers, have required expansion and specialization both in the staff and equipment. It is to the foresight of men such as Gray and Farlow, Sargent and Goodale — to their power to inspire pupils, direct research, and secure benefactions — that Harvard owes her present botanical equipment, both human and material, as well as the high standards of achievement that have enabled her to keep pace with the growing demand for botanical instruction and the need for botanical research. There is no reason to suppose that such development has come to an end. Quite to the contrary there are clear indications that Botany is bound to become increasingly vital to human welfare. With the rapidly approaching depletion of natural forest and grazing resources will come the need for their replacement by plant-cultures of unprecedented extent and difficulty. The world's rapidly growing population will find the question of food-supply one of terrifying significance. Crop-plants, their selection and improvement, and particularly their protection from disease, will become matters of unprecedented importance. The University, to maintain her high distinction in Botany, will have to make still further demands on the skill and organizing powers of her staff, backed by the loyalty of her sons and the generosity of an increasingly interested public.

XXIII. ZOÖLOGY

1847–1921

By Edward Laurens Mark, LL.D.
Hersey Professor of Anatomy, Emeritus

1. Agassiz and Wyman

WHEN the guidance of Harvard University was put into the hands of Charles W. Eliot, Darwin's Origin of Species had been before the public for about ten years. The opportunities for the undergraduate to get instruction in zoölogy at that time reflected to some extent the division of the educated world into two camps: evolutionists and anti-evolutionists. The prevailing earlier view, that each species of animals and plants had been separately created and maintained, was still upheld by the genial and distinguished Professor of Zoölogy, Louis Agassiz; while the Darwinian view of evolution had already been accepted by the more conservative Professor of Anatomy, Jeffries Wyman. Each a master in his field and each admiring the work of the other,[1] these men were as unlike in temperament as colleagues well could be: Agassiz robust, exuberant, imaginative if not visionary, persuasive and entertaining in word and bearing; Wyman frail, self-restrained though never self-conscious, dignified and retiring, but industrious, painstaking, patient, and gentle.

Agassiz, whose absorbing ambition was the creation of a great Museum of Natural History for Harvard,[2] was also a 'teacher' (as he is reputed to have modestly described himself), and possessed the rare combination of profound knowledge with the gift of making that knowledge understandable and attractive to layman as well as professional. That his interests were broad, is shown both in the Museum as he planned it, and in the subjects which he taught: zoölogy, paleontology, and geology.

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[1] Wyman's estimate of Louis Agassiz was once expressed in these words: 'Say what we will as to his views [on evolution], right or wrong, there is no mistake about it Agassiz was head and shoulders above us all.' (*Boston Medical and Surgical Journal*, cxci, 433.) Agassiz wrote to Milne Edwards in 1847: 'Wyman, recently made professor at Cambridge, is an excellent comparative anatomist.' (E. C. Agassiz, *Life of Louis Agassiz* [1885], p. 437.)

[2] See his grandson's chapter on the Museum, in this volume.

Wyman, too, was a collector, though on a more limited scale, and, in addition to many other kinds of material, assembled in his museum in Boylston Hall [1] objects of especial value for illustrating anatomy and physiology, the subjects which he taught. These were to some extent anatomical preparations of rare perfection made by his own skilful hands. He wrote on a variety of subjects, and the last few years of his life were largely devoted to building up and organizing the Peabody Museum of American Archaeology and Ethnology.

Much earlier than this zoölogy was taught in Harvard College, as a part of natural history. Asa Gray conducted courses in zoölogy in addition to those in botany, wherein his chief interests lay, from 1845 till 1855. During this period half-year courses in both subjects were prescribed. The instruction was chiefly by recitation, at first from Gould's Zoölogical Text-Book, which was replaced in 1848 by Agassiz and Gould's Principles of Zoölogy.

In 1847, the sciences in Harvard received a new impetus, through the founding of the Lawrence Scientific School. Important changes in the Harvard Medical School were contemporaneous: the Parkman Professorship of Anatomy and Physiology was established and Dr. Holmes was selected for the position. The Hersey Professorship of Anatomy and Surgery, till then held by Dr. John C. Warren (A.B. 1797), was changed to the Hersey Professorship of Anatomy, and transferred to the Scientific School. Dr. Wyman was chosen as the first incumbent of this chair. He thereby became one of the twelve persons who constituted the first faculty of the Scientific School.

Jeffries Wyman graduated from Harvard College with the class of 1833, at the age of 19, whereupon he entered the Harvard Medical School and received his M.D. in 1837. He did not, however, engage in the practice of his profession, but accepted the post of Demonstrator of Anatomy under Dr. Warren at the Medical School. During this period 'his means were very slender, and his life abstemious to the verge of privation.' [2] These circumstances were improved a few years later by his appointment as Curator of the Lowell Institute, where, in addition, he delivered a course of twelve lectures on anatomy and physiology. The year 1842 he spent abroad, chiefly in Paris, in the study of comparative anatomy and physiology, of human anatomy, and of zoölogy.

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[1] There is a photograph of the interior in *The Harvard Book* (1875), i, 127, somewhat misleadingly labelled, 'The Peabody Museum,' for the nucleus of the Peabody Museum collections was contained in the gallery, shown in the upper part of the picture.

[2] Memoir by Asa Gray, in *Proceedings Boston Soc. Nat. Hist.*, xvii (1874), 99.

Soon after his return from Europe he was appointed Professor of Anatomy and Physiology in the Medical Department of Hampden-Sidney College, Richmond, where his duties required his residence only during the winter and spring months. The remainder of the year he lived in Boston. Upon his appointment to the Hersey chair in 1847, he naturally gave up his post in Richmond.

As a lecturer, Wyman awakened the interest of his pupils and stimulated to an unusual degree their thoughtful attention.[1] As an investigator, his methods were preëminently careful and thorough. In drawing conclusions he was never hasty, and in studying controversial questions he kept an open and unprejudiced mind. These characteristics are shown in such papers as those on the anatomy of the gorilla (a name chosen by Wyman for one of the highest of the anthropoid apes), the memoir on the nervous system of *Rana pipiens*, and the accounts of the experiments he contributed toward the solution of the question of 'spontaneous generation.'

Pulmonary disease, symptoms of which appeared even before his graduation from College, was a continuous handicap to Wyman, and finally ended his career in 1874. In spite of the remarkable progress of science since his death, a competent authority, writing thirty-three years later, could name him 'the ablest anatomist this country has yet produced.' [2] Yet the sonnet dedicated by James Russell Lowell to Wyman's memory shortly after his death, remains the most truthful and beautiful tribute:

> The wisest man could ask no more of Fate
> Than to be simple, modest, manly, true,

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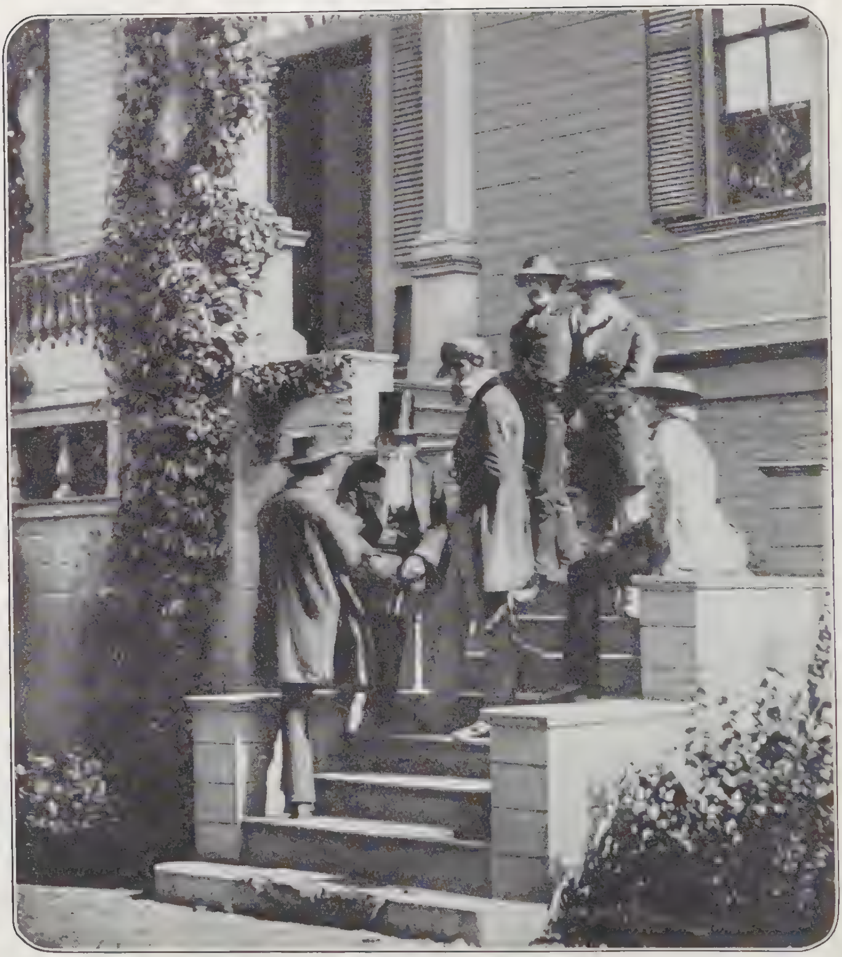
[1] Owing to the subject he taught, Wyman's pupils were largely men who entered the medical profession. Of them may be mentioned David W. Cheever (A.B. 1852), John Green (A.B. 1855), William H. Elliott (A.B. 1857), Henry P. Walcott and John Homans (A.B. 1858), Henry P. Bowditch (A.B. 1861). Among those who got their chief stimulus from Professor Wyman, the most prolific writer was the late Professor Burt G. Wilder (S.B. 1862) of Cornell University. W. G. Farlow and William James were also his pupils.

[2] Franklin P. Mall, in *Anatomical Record*, i (1907), 26.

JEFFRIES WYMAN



Left to right: Jules Marcou (?), Agassiz, Officer (Unknown), Henry J. Clark (?), Jacques Burkhardt, Wyman

A GROUP ON THE STEPS OF THE AGASSIZ HOUSE ON QUINCY STREET

ABOUT 1864

Safe from the Many, honored by the Few;
To count as naught in World, or Church, or State,
But inwardly in secret to be great;
To feel mysterious Nature ever new;
To touch, if not to grasp, her endless clue,
And learn by each discovery how to wait.
He widened knowledge and escaped the praise;
He wisely taught, because more wise to learn;
He toiled for Science, not to draw men's gaze,
But for her lore of self-denial stern.
That such a man could spring from our decays
Fans the soul's nobler faith until it burn.

Louis Agassiz was introduced to the general public as well as to the savants of the United States in 1846. Through the influence of Agassiz's friend Von Humboldt, the King of Prussia had commissioned him to make a journey of exploration to this country. The opportunity to deliver a course of lectures at the Lowell Institute, arranged through another friend, Sir Charles Lyell, was an added inducement. The extremely cordial reception of Agassiz, and the overwhelming attentions paid him on his arrival in America, arose in part from his established reputation as an eminent man of science, in part from his genial and optimistic nature. That he soon became widely known in all strata of American life, was due to the enthusiasm inspired by his popular lectures, the very first series of which was reported, and even illustrated, in the daily press of Boston.[1]

His appointment to the chair of Zoölogy and Geology in the Lawrence Scientific School was a prompt recognition of his talents and a valuable asset to the University.

One is inclined to think that the most striking feature of this new School[2] — the great personal freedom of the students — may have been largely due to the spirit of investigation which Agassiz brought with him from Europe.

Agassiz's influence as a teacher was exerted in two principal ways. He gave a course of most attractive lectures on Zoölogy (alternating with one on Geology), which was attended by

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[1] After reading these lectures it is a great surprise, amounting almost to incredulity, to learn that the author of the aphorism, 'study nature, not books,' had never had the opportunity to study marine animals at the seashore until he came to this country and began work at East Boston (*Life of Louis Agassiz*, pp. 442–445).

[2] See Dean Hughes's chapter on Engineering, in this volume, and College Catalogue for 1848–49, p. 59.

Seniors in the College and by students in the Scientific School, and likewise by persons not regularly connected with the University, especially schoolteachers. He also undertook the guidance of those who wished to become zoölogists and who possessed the qualities necessary for success. He was a constant source of inspiration to the young assistants in the Museum, not only through daily contact and encouragement, but also through the discussions which he led at the weekly meetings of the museum staff. Although these dealt chiefly with details of museum problems, they occasionally offered an opportunity for the presentation of general questions and theories, such as evolution and the descent of man. The well-known method pursued by Agassiz with students desiring to be zoölogists — the kill-or-cure plan — early eliminated the unfit; but if his method of selecting students was severe, his encouragement and his generosity toward those who showed the needed power of application and persistence in observing the objects put before them, were almost without limit. Those who survived recognized this introductory ordeal as one of the most valuable legacies that could have been left them by their friend and master. A list of those who thus gained admission to the ranks and subsequently did honor to their professions would embrace a large proportion of the zoölogists of the United Sates during the latter part of the nineteenth, and the early part of the present century. They included (to mention only a few) such men as Edward S. Morse, Joel A. Allen, John McCrady, Henry J. Clark (s.b. 1854), Alexander Agassiz and Theodore Lyman (a.b. 1855), F. W. Putnam, Alpheus Hyatt, S. H. Scudder, N. S. Shaler, and A. E. Verrill (all s.b. 1862), and William James.

2. Undergraduate and Graduate Instruction, 1874–1921

Zoölogical instruction by both Agassiz and Wyman, however lasting in its influence, did not extend far into the Eliot era, for Agassiz died in the autumn of 1873, and Wyman some nine months later. Indeed, for the last three or four years of Agassiz's life, owing in part to his failing health, in part to his Hassler Expedition to the Pacific coast, the more formal instruction in zoölogy at the Museum was turned over to Shaler, then the Museum Assistant in Paleontology. The instruction in comparative anatomy and physiology, given by Wyman since 1848, passed to other hands in 1872–73, the anatomical portion being given in that year by Dr. Thomas Dwight (A.B. 1866), the physiological portion by William James. Both parts of the course were given the following year by Thomas Waterman (A.B. 1864), and from 1874 to 1879, as Comparative Anatomy and Physiology of Vertebrates, at the Museum, by James.[1]

During the college year 1871–72 Professor Shaler had in Zoölogy the assistance of Albert H. Tuttle,[2] Instructor in the use of the microscope, and of Edward Burgess (A.B. 1871),[3] who gave 'a course of elementary instruction in the study of insects.' In 1872–73, to quote further from Professor Shaler's reports, 'the student [in his first year's course] is compelled to come at once into the position of an investigator, receiving only such assistance as may be required to help him help himself,' showing that the Agassiz method was now applied, as far as possible, to all beginners, regardless of their future aims.

In 1873, shortly before the death of Agassiz, John McCrady, Professor of Mathematics in the College of Charleston, S. C., took charge of the instruction in zoölogy,[4] and continued for nearly four years to conduct the work of the Department, till failing health led to his resignation. In addition to supervising the work of research students, he gave each year two courses of lectures (elementary and advanced) on General Zoölogy to a gradually diminishing number of College students. It was during this period, however, that the first four candidates for the doctor's degree in Zoölogy received the greater part of their special training at Harvard. Each became distinguished in his special field of research: William K. Brooks, Professor of Zoölogy and Animal Morphology at Johns Hopkins; Edward A. Birge, President of the University of Wisconsin; J. W. Fewkes, Chief of the Bureau of American Ethnology; Walter Faxon, Professor of Zoölogy at Harvard.[5]

For a better understanding of the history of Zoölogy in Harvard during this period, it is desirable to glance at the contemporary trend of the science in Europe. Advances were being made in two important fields, among others. First, invention and discoveries in the field of histological and microscopical technique, whereby the minutest structural conditions of large and small objects, whether opaque or translucent, were laid open to microscopic analysis; secondly, a concentration of the attention of many zoölogists on the phenomena that accompany cell division, and especially the remarkable internal changes, hitherto unobserved, which manifest themselves during the ripening and fertilization of eggs. Although at first sight it may seem that these two fields have little to do with each other, it is fairly certain that the advances in the latter were largely aided by the discoveries in the former. The elaborate and often complicated system of procedure, now commonplace, whereby whole organisms or parts of them are differentially stained, hardened or softened as the case may require, and infiltrated with homogeneous substances such as paraffin, in order to facilitate cutting them into sections so thin that they are translucent, or may readily be made so, was then in its infancy; but advance was so rapid that this new technique revolutionized the methods of biological work. The 'microtome' itself may almost be said to have created a new branch of biology; it certainly made possible investigations which could never have been achieved without its aid.

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[1] A course of lectures once a week on Physiology and *Hygiene*, open to all undergraduates, was given by Professor James for three years (1879–82). In continuation of this course lectures were given by Professor Dudley A. Sargent and others.

[2] Subsequently Professor of Biology at Virginia.

[3] See Professor Wheeler's chapter on the Bussey Institution, below.

[4] His official appointment dated from June 13, 1874.

[5] Charles Sedgwick Minot, who received the doctor's degree about this time, obtained his special training chiefly in Europe.

The unsuccessful effort to obtain Huxley as the successor of Louis Agassiz and the experiment of putting in charge of Zoölogy (in 1877) two young men without established reputation, naturally resulted in a slow development of the Department, especially on the investigational side.

During the first year of this experiment, the advanced course in Zoölogy was omitted, and the elementary course, with laboratory work, was divided. The first half, on radiates and crustacea, was conducted by Walter Faxon, who had had some three or four years' experience as laboratory assistant under Professor McCrady. The second half, on insects and mollusks, was given by the writer,[1] who was without experience in teaching zoölogy. This arrangement was especially favorable for the writer, as it allowed him to get acquainted with the plan of the work and his new surroundings before beginning his lectures, and also to prepare a certain number of charts, of a more or less diagrammatic nature, to supplement the rich store of diagrams already available, most of which were too small to serve as charts for the lecture room. Of still greater importance, was the opportunity that the first half-year thus afforded him to continue his investigations on the development of the garden slug *Limax*, which he had begun during his first (unemployed) year after returning from Germany.

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[1] A.B. (Michigan) 1871, PH.D. (Leipzig) 1876, appointed Instructor in 1877, Assistant Professor since 1883, and Hersey Professor since 1885; Director of the Zoölogical Laboratory since 1900, and Editor of the *Contributions from the Zoölogical Laboratory, Museum of Comparative Zoölogy at Harvard*, and the *Contributions from the Bermuda Biological Station*, since 1903. Professor Mark became emeritus in 1921. S. E. M.

In the rearrangement of courses, which occurred the next year, all those which involved contact with students in the laboratory were assigned to Dr. Faxon, and to the writer a course of introductory lectures intended primarily as a part of the general education of non-scientific undergraduates. This division of duties was naturally rather disappointing to the writer, whose chief desire was to stimulate a spirit of research among the students of the Department. The more, since he had grave doubts about being able to lecture successfully to students who would have no opportunity to study for themselves the objects with which the lectures dealt. Recourse was naturally had to class demonstrations on a limited scale, to the use of models where practicable, and to the assignment of reading on selected topics, the results of which were handed in by students as essays.[1]

At the very beginning of lectures in this elementary course the following well-meant advice was offered the lecturer by his friend, Professor Hagen: 'When you finish your lecture, be sure you at once withdraw and do not allow the students to question you!' This traditional German custom did not appeal to the lecturer, who immediately did quite the opposite, and invited discussion as the one thing essential to the students' progress and the instructor's growth.

Von Siebold wrote in a letter to Louis Agassiz in 1869, 'How is Dr. Hermann Hagen pleased with his new position? I think the presence of this superior entomologist will exert a powerful and important influence upon the development of entomology in North America.' Doubtless this expectation was fully realized, owing to Hagen's generous and helpful attitude toward all accredited entomologists who sought his assistance; but his formal lectures to undergraduates, read from manuscript without demonstration or illustrations, and delivered, we are told, with reluctance, could not have been particularly attractive or stimulating. His want of familiarity with the English language and his occasional use of a German word [1] made it difficult for students unfamiliar with the German tongue to follow him.

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[1] It was several years before a change was made to a more satisfactory plan, whereby the number of lectures was curtailed, thus allowing time for individual instruction in the laboratory to students in relatively small sections.

Two or three years elapsed before the writer was able to resume contact with students in laboratory work. Then, through the sympathetic coöperation of the Curator of the Museum, Alexander Agassiz, he obtained the use of a small room on the second floor of the Museum, nearly over the main entrance, for the accommodation of a few voluntary students in the study of embryology. Though at first without official status, this work was recognized in 1880–81 as suitable for fourth-year students in the Lawrence Science School, and after two years more was included in the list of Natural History courses open to college students. The equipment of the laboratory was meagre, the only modern microtome being the property of the instructor; but it sufficed for immediate needs. The lack of window space was, after a time, remedied by erecting a temporary wooden screen just inside and directly over the main entrance to the building.

Meanwhile a further rearrangement in the laboratory courses was effected through coöperation with the Department of Botany.

After the publication of Huxley and Martin's Biology (1874), and especially upon the establishment of Johns Hopkins University (1876), the attention of botanists and zoölogists was directed more and more to the common aspects of the two sciences, and a popular demand developed for courses in biology. The underlying motive in this new departure was largely physiological; it emphasized the fundamental nature of biological processes, rather than the morphological aspects of organisms which point to their possible genetic relationships. Possibly an indirect result of this demand was the establishment at Harvard (in 1879) of a course in Biology; but instead of being a unit in the prevailing manner, the course consisted of two parts, conducted respectively by a botanist and a zoölogist. However, the zoölogical half, at least, was still essentially a course in morphology. The one point of connection between the parts was the fact that neither could be taken without the other. This was a wise provision, since the course, required of all who desired to take advanced work in either Botany or Zoölogy, was intended primarily for students who purposed to become teachers of science or to enter the medical profession. Nevertheless, this inseparable union was protested against by the parents of some who were looking forward to the medical profession and saw no need for one or the other of the halves. At last the Departments decided, in 1912, that the parts might be taken separately. The instruction in the zoölogical half was assigned to Dr. Faxon, whose report for the year 1879–80 gives in detail the nature of the work done. His course in Advanced Zoölogy (6) was so stimulating to its members, that 'some of the students of their own accord embodied the results of their studies in original essays, which were presented before the Harvard Natural History Society.'

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[1] Soon after the writer arrived in Cambridge, he was astonished to hear Dr. Hagen quoted as having said that the female white ant sometimes reached the size of his abdomen — and Hagen's was no mean abdomen. No doubt the Professor had said, 'The females sometime get to be as big as *mein Daumen* [thumb].'

At the close of the college year 1882–83, four papers were completed by fourth-year students in the Lawrence Scientific School. Of the two on the embryology of insects, Howard Ayers's received the Walker Prize of the Boston Society of Natural History, and was published as a memoir; William Patten's was retained by the author, and with slight additions was presented the following year as a thesis for the doctor's degree at a German University, and printed in the Quarterly Journal of Microscopical Science for 1884. The other two, by William Barnes and Albert H. Tuttle, on problems in vertebrate embryology, were published in the Proceedings of the American Academy of Arts and Sciences, in 1883.[1] These four papers constituted the beginning of Contributions from the Zoölogical Laboratory of the Museum of Comparative Zoölogy at Harvard College, which, with one or two exceptions, have contained only the work of students and instructors in the Department. Over two hundred and thirty contributions had been published by the year 1921. Perhaps there is no better evidence of the activity of the Department than these Contributions, and the fact that the doctor's degree in Zoölogy was conferred on 79 candidates between the years 1891 and 1921.

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[1] Ayers was later President of the University of Cincinnati. Patten is head of the Department of Biology at Dartmouth; Barnes and Tuttle became successful practising physicians, and the latter taught Entomology at the Bussey.

Dr. Daniel Denison Slade (A.B. 1844), who had retired after several years as Professor of Applied Zoölogy in the Bussey Institution, was appointed Lecturer on Comparative Osteology, and lectured at the Museum to small classes from 1885 till his death (1896).

The completion by Mr. Agassiz in 1883 of the northwest corner section of the Museum, largely devoted to the laboratories of Natural History, gave the Department of Zoölogy greatly increased facilities for instruction and research. Among other advantages, it made possible individual laboratory instruction of the hundred or more students in the elementary course. The method put in practice aimed to train, rather than instruct: to develop the power of careful and accurate observation, tested in part by the drawings made by the student, and especially the ability to reason logically about the meaning of the observations made. The Socratic method was employed, with excellent results. A custom which sprang up in many laboratories of furnishing each student with printed instructions to 'see' this, 'observe' that, and 'note' the other, soon vitiated the main purpose of studying nature, not books. This practice was sedulously avoided in our laboratories.

Since much time was being given to instructing individually students of embryology in the necessary preliminary technique, it seemed desirable to establish a short course (so-called half-course) in microscopic technique, which should serve as preparation for subsequent researches. Such a course was introduced in 1885–86 under the name of Microscopical Anatomy. To preclude any tendency of the course to become purely mechanical, one or more invertebrates of comparatively simple organization were selected as the material to be studied; thus various technical methods of work were taught incidental to the study of the structure of such animals.

Professor Faxon resigned from the Faculty in 1886, but retained his position in the Museum. His principal contributions in zoölogy relate to the Crustacea, and embrace papers on the embryology as well as the taxonomy of the group. In later years, after his withdrawal from teaching, he devoted much time to the study of the habits of birds, and his two papers on Brewster's Warbler are models of both scientific and literary work; careful, patient, and persistent observations described with accuracy and charming simplicity. But his interests were much broader than these two fields, for he was an appreciative student of the works of Gilbert White and of Alexander Wilson, poet-naturalist, and his collection of Shaksperiana was extensive and unique.[1] He remained Assistant in Charge of Crustacea till his death in 1920.

After Faxon's resignation, the instruction in Zoölogy hitherto given by him was assigned to Dr. Howard Ayers, appointed Instructor in Zoölogy. Upon his retirement two years later, these courses were put in charge of George H. Parker (S.B. 1887), who conducted them for three years. He was succeeded in 1891 by Charles B. Davenport (A.B. 1889),[2] who had charge of these courses for two years. In 1891 the teaching staff was again increased, by the appointment of Dr. William McMichael Woodworth (A.B. 1888) to be Instructor in Microscopical Anatomy. He collaborated with the writer in the like-named course till 1897, when Agassiz selected him as one of the staff of scientific assistants accompanying him on his marine expeditions, and subsequently procured his appointment as Assistant in Charge and then Keeper of the Museum. Woodworth was an exceptionally dexterous person, and contributed materially to the success of the instruction in microscopical anatomy.[3]

In 1890–91 the general heading 'Natural History' disappeared from the catalogue, and the courses in Botany, Zoölogy, and Geology received independent numberings, those of research being designated as the '20' courses.

There was a further increase in the staff and in the subjects taught, as well as a considerable rearrangement of the courses, in 1893. Parker was reappointed Instructor, and in addition to other work gave a new half-course on the Nervous System and its Terminal Organs. Davenport also introduced a new half-course on Experimental Morphology. Relief from teaching the elementary course gave the writer more time to devote to students carrying on research work. There were now four teachers in the Department, in addition to numerous laboratory assistants.

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[1] *Harvard Library Notes* for December, 1923, pp. 261–263.

[2] Director of the Department of Experimental Evolution in the Carnegie Institution of Washington; located at Cold Spring Harbor, New York.

[3] His chief research was on a group of free-living worms, the *Turbellaria;* a paper 'On the Structure of *Phagocata gracilis Leidy*' being the most noteworthy. He died in 1912.

Upon the withdrawal of Woodworth, Dr. William E. Castle (A.B. 1893) was appointed Instructor in Anatomy and Embryology. Dr. Robert Tracy Jackson, Instructor in Paleontology, also became a member of the Department of Zoölogy, and gave a course on Fossil Invertebrates (Zoölogy 9). In 1899 Davenport resigned to accept a professorship in the University of Chicago, and Walter B. Cannon (A.B. 1896) was appointed Instructor in Zoölogy for one year, after which he began his career as Professor of Physiology in the Medical School. The writer was made Director of the Zoölogical Laboratory in 1900, and Dr. Herbert W. Rand (A.B. 1897) was appointed Instructor in Zoölogy. Parker gave a new half-course, Introduction to the Study of the Nervous System, as a prerequisite to two courses on the Nervous System, which thereby practically became research courses. Jackson also gave a new half-course on Fossil Invertebrates. From 1902–03, all Faculty members of the Department shared in supervising the work of research students.

Under a provision of the Graduate School, Dr. Alexander Petrunkévitch gave a course of lectures on Cytology during the second half of 1903–04.

Several of the more advanced courses underwent an expansion in 1905–06, in the sense that the subjects treated in a course were arranged in two groups given in alternate years, thus affording a better opportunity to cover the whole field more thoroughly. The reorganization of the Bussey Institution, with the appointment of William Morton Wheeler as Professor of Economic Entomology and Paul Hayhurst as Instructor, added three courses to instruction in Zoölogy in 1908–09, besides research work.

In 1909, Mr. Charles T. Brues succeeded Hayhurst as Instructor in Entomology, and in the following year he gave a new course, Forest Entomology. The title of the course in Practical Entomology was changed to Common Economic Insects and Methods of Controlling them. The course in Microscopical Anatomy was taken over by Professor H. W. Rand. Professor Willy Kükenthal of the University of Breslau was Exchange Professor in 1911–12, and gave the lectures in the elementary course in Zoölogy. He likewise gave, in German, a course for advanced students on Certain Aspects of the Comparative Morphology of Vertebrates.

Partly as the result of persistent efforts on the part of the Medical School to obtain greater variety in the preparatory work of prospective medical students, a considerable reduction in the time given to the fundamental courses in Zoölogy was inaugurated in 1912–13. The zoölogical part of the course in Biology was abandoned, and the course on Comparative Anatomy of Vertebrates was reduced by one half; Microscopical Anatomy (Zoölogy 4) was changed to General Histology, in conformity with a change in the nature of the instruction; Genetics and Eugenics, by Castle, was given for the first time.

The Department was fortunate in having two visiting professors at this period in successive years (1914–16): Harry W. Norris from Grinnell College, Iowa, and Maurice Caullery from the Sorbonne, who gave in French a course of lectures on The Present State of the Problem of Evolution. A new and advanced course in Genetics was begun by Castle in 1915–16.

Until the entrance of the United States into the World War, there were no important changes in the Department; and by 1919–20 the courses were again on a normal basis, without material change in subjects taught or in personnel.

In conclusion, the chief lines of work that have been particularly emphasized in the Department during the half-century covered by this narrative are:

Morphology, with special emphasis on histology and embryology: the experimental method of dealing with problems of form and growth, in an attempt to discover the factors which control them.

Neurology in its broadest sense, embracing the study, not only of the histological details of central structures and terminal organs, but also and especially the functional relations of the nervous system to all parts of the body as a whole, through the responses of animals to natural and artificial stimuli.

Genetics, studied especially by breeding experiments aimed at discovering the laws governing inheritance, and their practical application.

3. The Marine Laboratories

Five marine laboratories have been more or less intimately connected with the facilities for instruction and research afforded to students in the Department of Zoölogy:

In the summer of 1873 the Anderson School of Natural History, on the island of Penikese, the first marine laboratory to be established on the Atlantic coast of the United States, was opened and successfully conducted by Louis Agassiz — the last of his great undertakings. Its purpose was to afford opportunity for study and research to properly qualified persons, whether connected with Harvard or not. The session of the second and last summer, after Agassiz's death, was begun under the guidance of his son Alexander, who was compelled to withdraw owing to ill health, and leave the conduct of the School to Dr. A. S. Packard and F. W. Putnam.

Mr. Agassiz built on his private estate at Newport, R. I., in 1877, a small laboratory intended to provide, in a measure, facilities for marine work that would have been possible on a larger scale at Penikese had the Anderson School continued. Many instructors and students in the Department of Zoölogy, as well as assistants in the Museum and others, enjoyed the opportunity of working in the Newport laboratory until its closure in 1897.

By agreement with Agassiz, as Curator of the Museum, the United States Fish Commission assured to the University certain privileges in its Woods Hole laboratory, which have been utilized by the Department for many students and instructors.

In 1903 the Bermuda Biological Station for Research was established at the Flatts, Bermuda, through the coöperation of the Bermuda Natural History Society with Harvard University and New York University, under the management of the writer as Director, and Professor C. L. Bristol of New York as Associate Director. The agreement between the two universities was terminated after three years, and in 1907 the station was moved to Agar's Island, where it has since been in continuous operation under the directorship of the writer. For most of the time the station has been open during the greater part of the months of June, July, and August only; but for a period of nearly three years it was open the year round, under the immediate supervision of the Resident Naturalist, Dr. W. J. Crozier. More than three hundred persons, the greater portion of them connected with Harvard University, have worked at the Station; and upwards of 150 scientific papers have been published as the result of work done there.

The University has also subscribed since 1913 to a students' table at the Marine Biological Laboratory, Woods Hole, where courses of instruction have been followed by students, and facilities for research have also been afforded to instructors and advanced students. A table at the Naples Zoölogical Station was also available for a few years, through the generosity of Mr. Agassiz.

XXIV. RECENT DEVELOPMENTS IN BIOLOGY[1]

1921–1928

By G. H. Parker, S.D.
Professor of Zoölogy and Director of the Zoölogical Laboratory
AND
William J. Crozier, Ph.D.
Professor of General Physiology

1. Zoölogy

DURING the last decade, living animals have come to claim to an ever-increasing extent the interest of zoölogists. Twenty years ago, students of animal life were largely concerned with work on preserved specimens; by hand-dissection, by the use of the microtome, and by other such means, the complexities of animal structure were worked out, the living creature meanwhile receiving relatively slight attention. But to the modern investigator it became increasingly evident that animal life, to be successfully studied, must be approached through the living organism. Bottled specimens, however perfect their preservation, were no substitutes for the living. To such a source the real biologist willingly turned, that he might study the intricate web of life and the varied activities, instincts, and habits of the creatures about him. Animal behavior, taken in its widest sense, thus became a subject of all-absorbing interest, and led at once to the rapid growth of the general physiology of organized beings. Zoölogical laboratories, which had formerly been conducted chiefly for the study of structure, added to their programmes the study of animal activities.

This general movement, in which zoölogy passed from a science of static relations to one of dynamics, one in which experimentation became a part of the method of investigation, involved a revolution in laboratory equipment. It was necessary under the new plan to maintain in the laboratory stocks of living animals under essentially natural conditions both for classwork and for research; and in place of the relatively meagre outfit of dissecting apparatus, microscopes, and reagents of the earlier days, the new project called for aquaria, vivaria, dark rooms, and a full equipment of physical and chemical appliances. By these means the measurement of such environmental features as heat, light, pressure, and the like, all of which play an important part in animal activities, could be carried out, and the understanding of animal reactions approximated. Into a laboratory thus equipped, the living animal, observed and studied in the field, could be transported and exhaustively tested. The transformations necessary to accomplish such ends have been in some measure reached in the Harvard Zoölogical laboratories; but much remains to be done.

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[1] This chapter does not pretend to cover the whole field of biological sciences in the University since 1921, for which see the chapters on Botany, the Zoölogical Museum, the Bussey Institution, and the Medical School. It merely supplements Professor Mark's chapter by tracing the development of the Zoölogical Department since 1921, and the work of the new Department of Physiology. S. E. M.

In carrying out this new programme, our laboratories were fortunate in their personnel. The introductory course was reorganized on the basis of the living animal, and exercises on animal reactions and activities were added to the laboratory exercises. This policy was continued after the introductory course in Zoölogy had been combined with that in Botany, thus offering the students a truly biological elective (Biology 1). In consequence of the large number of applicants for this work, more than could be accommodated in the course as then organized, a second introductory course (Zoölogy 1) was instituted; but in both courses the policy of emphasizing the living animal prevailed.

The courses in Comparative Anatomy and in Microscopic Anatomy, given by Professor H. W. Rand for some years back, were continued and were attended by ever-increasing numbers of students. These students were preparing themselves for medicine or for advanced work in biology. The remaining courses in the Department, partly intermediate in character and partly advanced, were almost all on an experimental basis. Professor Rand offered work on the factors that determine form in the developing animal. Embryology, which had been given previously as a descriptive subject, was dealt with as an experimental science by Professor S. R. Detwiler (PH.D. Yale, 1918), who was called from the Peking Union Medical School by Harvard in 1923, to organize this work. Dr. Detwiler's laboratory had an enthusiastic following. On his transfer from Harvard to Columbia University, as head of the anatomical department of that institution, his place was taken by Professor Leigh Hoadley

(PH.D. Chicago, 1923), who has continued with striking success the same line of work. The general field of animal reactions and activities, especially those associated with the nervous organization of living forms, has been chiefly in the hands of Professor G. H. Parker. The younger men on the laboratory staff, Dr. J. A. Dawson (PH.D. Yale, 1918) and Dr. Jeffries Wyman, Jr. (A.B. 1923), have been working experimentally, Dawson on problems of the simplest one-celled animals and Wyman on muscle.

During this period of laboratory transformation much help has been received from the two distinguished entomologists attached to the Bussey Institution: Dean Wheeler and Professor Brues.[1] Their courses on various aspects of insect life have brought many of our students into close contact with the life histories and the natural field activities of these interesting forms. Professor Castle, also of the Bussey, has conducted work on animal genetics both in the classroom and in advanced research, on the basis of living material.

One of the most important of the recent advances in zoölogy at Harvard is the association of the assistants in the Museum of Comparative Zoölogy with the activities of the Department. In 1922 Dr. Thomas Barbour, now Director of the University Museum, and Dr. Henry B. Bigelow offered for the first time research opportunities to properly qualified students in the fields of activity represented in the Museum by these two investigators. This departure proved so successful that in 1924 Dr. G. M. Allen (A.B. 1901), also of the Museum staff, was invited to give courses on the natural history of mammals and of birds. In 1928 were added to this growing list the names of Professors Hubert L. Clark and Nathan Banks, both of whom offer to advanced students opportunities for Museum work in their respective subjects. These new openings have given a great impetus to the natural history work of the Zoölogical Department; besides offering an excellent general field-training for our graduate students as a whole, they have introduced new lines of work, such as the training of museum experts, and in the hands of Bigelow they have laid the foundations of a special school of oceanography.

As stated in the previous chapter, for many years Harvard has been privileged to send a number of students each summer to the Woods Hole Laboratory of the United States Bureau of Fisheries and the Marine Biological Laboratory. The Harvard Biological Laboratory at Soledad, Cuba,[1] and the Barro Colorado Biological Station in the Canal Zone have given our men contact with a semitropical and a tropical fauna of inestimable importance to them. With the ever-growing significance of the tropics as a region of enormous productivity in supplying the wants of man, these experiences are of much benefit to those who are preparing themselves for a biological career.

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[1] See Professor Mark's chapter on Zoölogy, above, and Dean Wheeler's chapter on the Bussey, in the present volume.

In seven years the election of courses in zoölogy by undergraduates has approximately doubled. The instructors in the Department in 1921–22 numbered five, in 1928–29 thirteen. Then there were twenty graduate students in Zoölogy, now forty. Eighteen candidates from the Department have obtained the PH.D. During this period the publications by members of the Laboratory, including books, special papers, and the like, numbered one hundred and seventy-eight. These facts in brief are statistical evidence of the growth of Zoölogy at Harvard between 1921 and 1928.

2. PHYSIOLOGY

The complexity of life-phenomena long supported an unfortunate presumption: that it was probably impossible to determine the nature of the properties of living matter from the behavior of living beings. Since 1900 the rapid growth of General Physiology, synonymous with Experimental Biology in its quantitative aspects, has shown the limitations of that view. The subject, with the Laboratory of General Physiology, was established in 1925 as a separate Department within the Division of Biology. It has enjoyed the continuing friendly interest and good-will of its elder namesake in the Medical School. Its especial concern is not with the healthy functioning of the human body, but with the properties of living matter as such, and thus to a large degree with those attributes of organisms appearing both in plants and in animals. From 1920 to 1925 the necessity for a bridge of this kind between Botany on the one hand and Zoölogy on the other had been recognized in a practical way, in the granting of three doctorates of philosophy in

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[1] See the last section of the chapter on Botany, in this volume.

General Physiology. The work in this field included particular portions of Professor Parker's field in Zoölogy and Professor Osterhout's in Botany.

Courses in Physiology and Hygiene for undergraduates were given for a number of years by Dr. Roger I. Lee (A.B. 1902), and later by Dr. Alfred Worcester (A.B. 1878), his successor in the Henry K. Oliver Chair of Hygiene; but the quite different objective of this instruction is now more directly attended to by the work in the Department of Physical Education, especially in its prescribed course of 'approved physical activity' for Freshmen. The setting up of a separate Department of Physiology implied that the preparation of scholars for teaching and research in physiology is an essential part of instruction in biology, as had long since been recognized by the Universities of Paris, Oxford, and Cambridge.

In 1925 Dr. W. J. Crozier (A.M. 1914, PH.D. 1915) was called from Rutgers College to start the new Department. Dr. A. E. Navez, formerly of the University of Brussels, was appointed Lecturer in 1926; in addition, the staff comprises three instructors, a technician, and several assistants.

The courses conducted in the Laboratory of General Physiology deal with properties of living systems as considered from the standpoint of dynamics, and with emphasis upon quantitative methods. They are intended to afford an introduction to, and opportunity for research in, the analysis of fundamental functional activities of animals and plants; and are accordingly taken both by students preparing for medical careers and by those broadly interested in biology, provided they have some previous preparation in biology, chemistry, and physics. The Laboratory at present occupies one large and three smaller rooms on the second floor of the University Museum, together with two research rooms, two small laboratories, and a shop, in the basement. Much of this space had earlier been devoted to the study of plant physiology, under Professor W. J. V. Osterhout.

Young as the Department is, already sixty-seven papers have been issued as a series of Collected Reprints. These papers, by graduate students, research fellows, and instructors, deal with such topics as tropistic responses of animals and plants, and mechanisms of excitation; relations between temperature and vital processes (these two lines of investigation looking toward the characterization of activities of the central nervous system); the analysis of growth; catalysis of respiration; formation of chlorophyll and the mechanism of photosynthesis; the 'spontaneous' activities of animals; the electrical impedance of cells and tissues; and the physiological characterization of hereditary units. Four doctorates have been granted (up to mid-years, 1928) to students from the Laboratory, and its facilities have been utilized by ten research fellows and by several guest investigators.

The interests of the Department of Physiology, superficially diversified, are bound together by the endeavor to treat organisms as physical systems: to extend to Biology the fruitful methods of the quantitative sciences.

XXV. THE MUSEUM OF COMPARATIVE ZOÖLOGY

1858–1928

By George Russell Agassiz, A.B.
Overseer of Harvard College

THE University Museum, planned and founded by Louis Agassiz in 1859, forms a great open quadrangle, with its façade facing Oxford Street, to the north of the Chemical buildings. It was completed in 1914, when an extension of the Peabody Museum of Archaeology, in the south wing, closed the gap between it and the rest of the building. Here are housed most of the departments of Biology, and also those of Mineralogy and Geology. The southwest corner-piece, given by the children of Louis Agassiz, was opened in 1902. To commemorate the event the President and Fellows held a reception in some of the new rooms, and invited the members of the staffs of the various departments of the Museum and their wives, the old pupils of Louis Agassiz, and everyone especially interested in the Museum. On this occasion Alexander Agassiz, at that time Director of the University Museum, read an address on the history of that institution.[1] Much of the earlier part of this article is taken bodily from that paper.

The elder Agassiz[2] accepted a professorship in the Lawrence Scientific School in 1847, and took root at Harvard, in a house on Oxford Street, where the new Mallinckrodt Laboratory now stands. Once established in Cambridge, the professor kept his collections in a ramshackle little shanty perched on piles on the marshy banks of the Charles, the present site of the Weld Boat House. This was the first ancestor of the University Museum, and more especially the beginning of the Museum of Comparative Zoölogy.

As time went on Agassiz made explorations to various parts of the country, and returned with cases of specimens, which were stored — many of them never having been unpacked — in the cellar of Harvard Hall, and in every other inch of space he could obtain anywhere in the College buildings. In 1850 most of his treasures were moved to a wooden building called Zoölogy Hall, that then formed part of the Scientific School. This modest edifice, one of the least ostentatious of University structures, is probably more travelled and has been put to more uses at less expense than any other member of the family. During its lifetime it has served some half-score different purposes, and after wandering to various parts of Cambridge, now rests in its old age under the shadow of the Law School, where it houses undergraduate astronomy.

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[1] *Harvard University Museum — its Origin and History:* an address at the opening of the Geological Section of the Harvard University Museum, July 12, 1902 (Cambridge, 1902).

[2] See Professor Mark's chapter on Zoölogy, above.

By 1852 the care of the growing collections had entirely outstripped any private means of Agassiz's, and he applied in all directions for assistance. At that time the College made him a small annual grant, but that far from covered the expense. Finally Samuel A. Eliot, then Treasurer of the College, raised a subscription of about twelve thousand dollars to purchase the specimens. The means thus obtained the Professor used at once to increase the collection. Then began a system of scientific financing which perhaps has not had its equal at any time. Animated with a desire for the scientific welfare of his adopted country and university, Agassiz poured out his unbounded energy with reckless enthusiasm to create a Natural History Department which should be the equal of any in Europe. Whenever he managed to get any money, he invariably used it as a lever to obtain what was usually a larger sum; and so he kept on again and yet again, until he had accomplished, if not the whole, at all events a large part, of his project.

In 1858 his long-hoped-for opportunity came. Francis C. Gray (A.B. 1809) left the sum of fifty thousand dollars to establish a museum of natural history in connection with Harvard University or any other institution. This was placed at Agassiz's disposal, on condition that the building should be called the Museum of Comparative Zoölogy. And thus it happens that the Museum is saddled with a cumbersome and unsuitable name, which does not adequately suggest either its origin or its activities. An apparently permanent misfortune; for if Harvard is to preserve the confidence of her future patrons, she must scrupulously adhere to the terms of their bequests.

Why the name was originally chosen is something of a mystery, as Louis Agassiz contemplated a university museum such as we now have; and his collections contained not only a large series of zoölogical specimens, but also fossils, rocks, minerals, palms from Brazil, archaeological objects, and an immense amount of material which finds its place in a great museum of natural history.

Fifty thousand dollars was a great sum in those days; but he was not satisfied with that. Accustomed as he was to European government support for such enterprises, but against the advice of his friends, he went to the General Court of Massachusetts, and, much to everyone's surprise, secured $100,000 from those practical Yankees; while he also obtained a public subscription of about $71,000 for a fireproof building. The grant of $100,000 he persisted in regarding as available for collections, and to be immediately spent. This was but the first of many grants that he secured from the Commonwealth. No wonder that a state legislator remarked sadly during the Civil War, 'Agassiz is going to speak to us to-morrow. I wish he would n't. We can't afford to give him anything now, but after we have heard him we will.' Another evidence of his hold on the community was a subscription from twenty-five hundred people to his four volumes of Contributions to the Natural History of the United States, mostly from those usually lacking an interest in science.

In 1859 the cornerstone of the first small section of the Museum was laid, on land given by the University. This section forms the east part of the north wing; it had four rooms on a floor and was five stories high. The event was celebrated with imposing ceremonies, under the auspices of Governor Banks, who continued to show his interest in the institution for the rest of his life. The Museum was under the control of a Board of Trustees representing the Commonwealth and the University, with Governor Banks as President.

Toward the end of 1859 a large part of the collections was transferred to this building, and by the time of his first report in 1860, Agassiz was installed in his new quarters. There, besides his own work, he was busy superintending that of about nineteen assistants. Among these were Lyman, Barnard, Clark, Cooke, Hyatt, Ordway, Morse, Putnam, Shaler, Scudder, and Verrill, who assisted in moving the collections and remained devoted friends of the institution. New assistants flocked to join the ardent band, and no one appreciated more than Agassiz the value of the services that they rendered the Museum. In fact, it was to their disinterested devotion that the growth and prosperity of the Museum were due. Many of these men were long connected with Harvard, and others were scattered through the country, holding positions as professors or directors of museums. Most of the prominent American naturalists of that generation were men who had worked under Louis Agassiz.

Theodore Lyman (A.B. 1855), and a few others, set a precedent for volunteer assistants, serving without pay. Up to the present day there have always been a number of such assistants. It is doubtful whether the Museum could have survived without them.

Faithful to his former methods, Agassiz always looked on any new windfall as a sum to be spent immediately on collections. Indeed, it had usually already been discounted. Under these circumstances the votes that the Trustees were constantly passing for a conservative disposal of the funds were somewhat futile.

During the Civil War, Agassiz wrote to Theodore Lyman, then on Meade's staff at the front:

> The possibility of sharing in the present movement was in itself reward enough for whatever I may have done for my adopted country, and there is another feature that makes me very happy, the chance of working so successfully in the Museum, that when our troubles are over it may appear that civil war even cannot cripple the onward progress of science in the New World, and I count upon you to help me and to aid me in inducing others to help me going on, if possible, at an increased rate. All our friends advise me to stop, or to go on more slowly. I say now is the time when I should stretch every nerve to do as much as possible. There is after all no great merit in doing in prosperous times about as much as other nations do for science and letters; but in difficult times to show that the intellectual interests of the community are taken care of with as great solicitude as in ordinary times, that would be worthy of a great nation.

In his report for 1867 Agassiz sketched out in a general way a plan for the arrangement of the collections in the Museum, which then consisted of the first portion of the wing, built in 1859; but the rooms at his disposal were inadequate for the accumulating mass of material which poured in from every side. The lecture rooms were invaded, until finally it was almost impossible to move about in them. By 1868 the collection of fishes, of which Samuel Garman (S.B. 1875) was later for many years the distinguished Curator, had already become one of the first in the world; and the marine invertebrates were probably without a rival among other museums. Oceanography received an immense impetus from the accession of Count Pourtalès, who came to the Museum from the Coast Survey. A large amount of material collected by the different vessels of that Bureau was sent to him, and he continued the marine investigations which had been begun by Louis Agassiz in his early days in the United States, when he explored the waters of Florida in the *Bibb*, under the auspices of the Coast Survey.

Many of the Museum assistants at that time had become prominent specialists and marked men in their several departments. In addition to the pupils who grew up to be his aids, he also called in a number of specialists, among them Dr. Hermann Hagen, the best all-round entomologist in Europe,[1] Mr. J. C. Anthony, Professor Jules Marcou, Baron Steindachner, and Mr. Wachsmuth. The collections which developed under these men soon became most important.

Agassiz took part in a large number of scientific explorations. Those to the South, to the West, as well as his earlier expeditions to Lake Superior, supplied a large amount of material for the Museum. By far his most important expedition, however, was that to Brazil in 1865–66, financed by Nathaniel Thayer. The earliest scientific memoirs of Agassiz were devoted to Brazilian fishes, and he had received a collection from Dom Pedro II, who had been in constant correspondence with him. In consequence of this, the expedition was welcomed by the Emperor when it arrived in Brazil. Its members were the guests of the nation. Steamers were placed at their disposal to take them up the Amazon. The governors of the various provinces supplied men, means, and material to assist them in every possible way. The collections sent back form some of the most important of the Museum; especially that of the fishes from the Amazon, remarkable not only for the number of species, but also for its quantities of specimens. When Alexander Agassiz spoke of the tax it had been to himself and the other assistants to unpack and take care of the spoils sent home, his father remarked, 'Well, it was a greater labor to collect and pack them.'

Failing health began to tell on Agassiz's usual activities. In 1871–72 he made a voyage on the Coast Survey steamer *Hassler*, by way of the Straits of Magellan, to California, hoping to come home with renewed vigor and supervise the rearrangement of the Museum collections in the new part of the wing, which was then under construction. As usual, his friends came to his assistance, and the vessel was thoroughly fitted out for marine work. Unfortunately, the apparatus which was to be used for deep-sea dredging, upon which he and Pourtalès relied for great results, was exceedingly defective, and they were obliged to limit themselves to dredging in comparatively shallow waters. This was a great disappointment to both. However, on his return Agassiz wrote to Lyman, who was then in Europe getting in touch with European naturalists and arranging for exchanges with foreign museums: 'The collections made during the *Hassler* Expedition are simply splendid. We have brought home 265 barrels or boxes of specimens; averaging nearly one per day of our working time.'

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[1] See Professor Mark's chapter, above.

During this trying period Theodore Lyman served as Treasurer of the Museum. His rare common sense acted as a balance-wheel in its somewhat hectic development. The correspondence between him, Alexander Agassiz, and Louis Agassiz, reveals the patient if sometimes discouraged efforts of two executives striving to establish the Museum on a solid foundation, and endeavoring to restrain from reckless expenditure an enthusiastic genius, eager for the immediate growth of his intellectual child, and confident that the future would take care of itself. It was like trying to chain the foot of a rainbow.

The last year of Agassiz's life was made happy by the tact and generosity of his son-in-law, Quincy A. Shaw, who gave $100,000 to be spent at the professor's absolute discretion, without any restrictions from his trustees. This put him in a seventh heaven of joy, and he wrote to Theodore Lyman:

> I delight so much to write you something of the great event which you know already, but the importance of which, for my whole life, you hardly realize. Think of one hundred thousand dollars at the disposal of one who never in his life has known what it was to be able to do what he thought he could do best; and to have it so as to be free from every well meant advise [*sic*], which in most cases is only an aggravation of already overpowering difficulties. I am sure, now, that if my life is spared a few years only, we shall have the first working Museum in the world.

Although in that year he received, in addition, about fifty thousand dollars from the Commonwealth and from other sources, he managed by December to be forty thousand dollars in debt.

On the death of Agassiz, in December, 1873, the management of the Museum fell to his son.[1] Alexander Agassiz was not only a man of science, but also, unlike his father, an unusually able executive. Educated as an engineer, he began his career as an aide in the Coast Survey, and spent a year charting the gulfs and sounds of our Northwest. Finding, however, that blood was thicker than water, he returned to his father's museum, where he took his place as an impecunious assistant. There he devoted himself to helping to run the institution, in the care of the collections, and in the research work in marine biology which laid the foundation for his eminence in science. But the slenderness of his purse chafed; he wanted easier living conditions for his growing family, and ampler opportunities for publishing his scientific work.

Meanwhile his brother-in-law, Mr. Shaw, had become involved in some copper mines in northern Michigan. The character of the deposit offered a new problem in copper mining; the property was mismanaged, and threatened disaster for all concerned. When the state of things looked blackest, young Agassiz went up to Calumet, to see what he could do with the property. In less than two years of strenuous and desperate labor in the wilderness, he succeeded in building up the mines on a solid foundation, and headed them safely toward their career of phenomenal prosperity. Then he returned to the Museum and resumed his studies, while retaining the management of the Calumet and Hecla. At about the time of the death of his father, the fruit of the son's labors at Calumet began to mature.

Under Louis Agassiz, four-fifths of the north wing of the Museum had been built. It was crowded beyond belief, and had an income of only $10,000. The future of the institution did not seem bright; it looked as if it might share the fate of so many great undertakings, and perish with its founder. Alexander Agassiz thought otherwise. Filial affection made him put his shoulder to the wheel to preserve the Museum, and for the rest of his life he devoted much of his energies and a good slice of his fortune toward its development. In less than a year he had collected $300,000, much of it subscribed by Shaw and himself. Among the donations, two are interesting as showing the place

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[1] See G. R. Agassiz, *Life and Letters of Alexander Agassiz* (1913). S. E. M.

ALEXANDER AGASSIZ

WILLIAM MORTON WHEELER

that the elder Agassiz had in the community as a teacher, and what the population of Calumet thought of the younger. One was a donation of about $9,000 from some 86,000 teachers and pupils from many parts of the country; and the other, $1215 collected by over 1200 employees of the Calumet and Hecla Mining Company, at a time when there were 1400 men on its payroll. This sum was invested, and any deficiency in the running expenses was made good by Mr. Agassiz during his lifetime.

In 1876 it was found advisable to discontinue the joint control of the Commonwealth and the College in the affairs of the Museum. By legislative act it was turned over to the University and its management vested in a Faculty of five, including the President of the University and the Director of the Museum.

In the days of the elder Agassiz, he and his assistants, in addition to their museum work, gave a certain amount of instruction to graduates, undergraduates, and special students. The younger Agassiz disliked to teach, and never did so, except for the occasional supervision of the work of a few advanced students. Under his régime the teaching of zoölogy was made a separate department under the control of the faculty of Arts and Sciences. But it continued to have its headquarters at the Museum, where it made use of the collections, laboratories, and lecture rooms. Louis Agassiz would have been in entire sympathy with this arrangement, for although he devoted much of his own time to teaching, he wrote to Theodore Lyman in 1870:

> The Museum should, as a matter of course, provide the materials necessary for the best and fullest instruction in every department of Natural History, but it cannot provide teachers, any more than the library can provide professors, even though it should have all the books on hand which scholars and scientific men require. Museums are to science what libraries are more especially to scholars.

Alexander Agassiz completed the Museum of Comparative Zoölogy as it now stands. In 1877 he built the remainder of the north wing; in 1883–84, the northwest corner-piece; and in 1890–91, a further continuation of the façade.[1]

In an address in 1902, previously mentioned, Agassiz says, beginning at a time after the northwest corner-piece was completed:

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[1] These are the dates of completion or first occupancy; see plan in A. Agassiz, *Harvard University Museum; Origin and History* (1902), facing p. 18.

About one sixth of the floor space was devoted to exhibition purposes, and it was then possible to carry out the ideas which had floated vaguely through Professor Agassiz's mind. In this way a museum was formed, the like of which has not been seen elsewhere. It is not simply an agglomeration of room after room, of case after case, filled with specimens which to the uninitiated mean nothing; but it is a museum which has been intelligently arranged. Each room means something; each room is there for a purpose; each case is there for a purpose; and each specimen should be there for some reason. But that is not the way museums are conducted usually. Generally there are merely immense spaces which are filled with specimens, and as long as they are filled with interesting specimens, it matters not whether or not they are there for some specific object. That is one of the things which has impressed me in examining foreign museums and foreign institutions of the kind: there seems to be no reason, except that of satisfying an idle curiosity, why the museum should exist at all. Until museums are arranged on something like the plan we have adopted, it does not seem to me as if museums would accomplish what they ought to do for the information and instruction of the public.

But what is shown to the public is by far the smallest part of the Museum. Above and below the exhibition floor are three stories and a basement in which are stored, as it were, the archives of the Museum. I say nothing now of the library, the lecture-rooms and laboratories,[1] which are used by the professors and their assistants at Harvard University, who contribute so great a share in the development of the Museum. In these other rooms are stored collections which have been made during the explorations and expeditions of the professors and their assistants; collections without which it is impossible for a teacher or professor in natural history to exist. While it is very important to do a certain amount of work in the field in the various departments of natural history, there are a great many questions that can only be solved by the study of collections intelligently made. All questions, for instance, which relate to geographical distribution on land and sea, to variations, to systematic botany and zoölogy, and to the history of the human race, can only be solved by immense collections, carefully made, and which can be studied with ample room. Those are conditions which a university must aim to give to its professors. They are conditions which, up to a certain extent, exist but might be made infinitely better. There is not one of the professors or of the assistants whose time is not taken up more than it ought to be with drudgery, and were it possible to increase the staff of teachers and of assistants, it would be a simple thing to allow each a certain amount of work and

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[1] Mr. Agassiz is speaking of the University Museum as well as the Museum of Comparative Zoölogy.

> enable him to keep his place in the struggle which there is for scientific supremacy among the different institutions of the country.
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> It is of the greatest importance that a university museum should not attempt to do what larger museums can do with impunity. Our object is not to make vast collections, simply for the sake of having vast collections. Our object should be to make collections in such a way that they may be used to illustrate certain points, or used to carry on certain lines of investigation. That is really the function of a university museum. Here we have gathered the material in order to give our professors and our teachers all the work which they can do and do credibly.

In the first annual report after Alexander Agassiz's death, Mr. Henshaw, the new Director of the Museum, wrote:

> And yet so successfully and with so true a sense of proportion did Mr. Agassiz develop the whole Museum, that the distinguished English naturalist Wallace stated in 1887 that as an educational institution for the public, for students, and for the especial investigator, the Museum of Comparative Zoölogy was superior to the British Museum, and probably equally in advance of every other European Museum.

The elder Agassiz's interest in geology resulted in the Geological Department being more closely related to the Zoölogical Museum than the rest of the University Museum. Shortly after his death, the Sturgis–Hooper Research Professorship in Geology was established as a part of the Museum of Comparative Zoölogy. The nomination for an incumbent comes from its Faculty, and the collection of geological fossils, started with Louis Agassiz's specimens, is in charge of a curator, under the same appointment.

The first Sturgis–Hooper Professor, Josiah Whitney, a man of great energy and ability, who was devoted to his science, gave the Department a great uplift and set a high standard for his successors.[1] At his death he bequeathed his library to the Museum of Comparative Zoölogy, and it now forms part of its library, which in 1928 consisted of 65,500 volumes and 75,000 pamphlets.

Alexander Agassiz made nearly a score of oceanographic explorations to many distant seas, and brought back vast quantities of material which greatly enriched the Museum collections.

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[1] See the chapter on Geology, above.

These are now, without exaggeration, of inestimable value. To enumerate all these expeditions would sound like Homer's catalogue of ships and would have no place in a short sketch of the Museum. Among the most important were three cruises of the *Blake*, 1877–80, a vessel of the Coast Survey, in the Atlantic and Caribbean; three cruises of the Fish Commission steamer *Albatross*, 1891, 1899–1900, 1904–05, covering vast regions of the Pacific; an exploration of the Great Barrier Reef of Australia in the steamship *Croyden* in 1896; and an expedition to the Maldive Islands in the Indian Ocean in the *Amra* in 1901–02. The collections brought home from these voyages were distributed to the specialists throughout the world best qualified to describe them, Agassiz reserving for his own study the collections in his especial field. The results of all these investigations, as well as a general description by Agassiz of each expedition, were issued in the publications of the Museum.

In 1898 Agassiz resigned the directorship of the Museum of Comparative Zoölogy, but retained his quarters there, giving it his financial support, and continuing to enrich it with the results of his scientific expeditions. Indeed so lavishly did he continue to draw on his fortune to develop and maintain the Museum that, at his death in 1910, he was Harvard's most liberal benefactor.

After his resignation, the Museum was managed for a short time by Dr. W. McM. Woodworth, one of Agassiz's assistants in various of his expeditions. Dr. Woodworth was succeeded by Mr. Samuel Henshaw, who had been on the staff of the Museum since 1892, first as an assistant to Dr. Hagen, and later as the learned Curator of the Entomological Department. After Agassiz's death, without the stimulus of his interest or his financial support, the management of the Museum became a trying and discouraging matter. But Henshaw, with a whole-hearted and unwavering enthusiasm, and an almost unparalleled devotion, gave his entire existence to furthering the welfare of the Museum, to upholding its traditions and maintaining the high level of its scientific output. This he was the better able to do from his wide range of accurate knowledge, an invaluable asset in editing the reports of the specialists on the collections of Agassiz's expeditions, which were still coming in to swell the Museum publications. These, from its earliest history, have given the institution a distinguished international position among its peers, and include to-day sixty-five octavo and forty-eight quarto volumes, which are in quality and quantity fully equal to the publications of scientific societies of the first rank.

On the completion of his thirty-fifth year as a member of the staff, Henshaw resigned his directorship, on November 1, 1927. He was succeeded by Dr. Thomas Barbour (A.B. 1906), who has been connected with the Museum ever since his graduation from Harvard, more recently as Curator of Reptiles. Barbour has enriched the Museum with collections made on expeditions to the East and West Indies, and many portions of Central and South America, and for years has generously supplemented its hard-pressed funds in many helpful ways. He brought to his new office, not only an unusual breadth of zoölogical knowledge, a rare quality among the specialists of to-day, but, what is rarer among men of science, an executive ability of the first class. Thanks partly to his dipping very generously into his own pocket, Barbour has been enabled to undertake some much-needed renovations in the Museum.

The Museum will eventually receive, from the estate of Alexander Agassiz and other sources, a very considerable fund, mostly available for establishing research professorships and opportunities for research and exploration, which should place the Museum in an enviable position. As Agassiz has said, these latter functions are the chief desiderata of a university museum. In view of such circumstances, Barbour wisely decided to rearrange the exhibition rooms, with a view to obtaining much-needed space for the library and the study collections. The standard exhibition rooms are furnished with a gallery; most of these will eventually be floored over, giving ten new rooms for the research department, which should provide for its expansion for a number of years.

To facilitate the training of young men as future members of the Museum staff, and to enable them to obtain advanced degrees, arrangements have lately been made whereby some of the curators have received university appointments, and instruct, at their pleasure, a few mature students. Barbour now has the title of Professor of Zoölogy; and the following Curators have been appointed Associate Professors: Dr. Henry B. Bigelow, of Oceanography;[1] Dr. H. L. Clark (PH.D. Johns Hopkins, 1897) of Marine Invertebrates; Nathan Banks (S.M. Cornell, 1890) of

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[1] See the chapter on Geology, in this volume.

Entomology; and Dr. Glover M. Allen (A.B. 1901) of Mammals. Outram Bangs '84, Curator of Birds, and senior member of the staff, elected not to receive such an appointment; and Professor Percy E. Raymond already had an appointment on the teaching staff, devoting only half his time to the collection of fossils.

If the Museum authorities continue to pursue the wise and able policies that have characterized their management in the past, they may confidently look forward to the time when the Museum, armed with ample resources and unrivalled opportunities for research, will command the services of the most eminent international zoölogists, and in that branch of scientific activity will be universally recognized as Mecca.

XXVI. ENGINEERING

And Other Applied Sciences in the Harvard Engineering School and its Predecessors

1847–1929

By Hector James Hughes, A.B.
Professor of Civil Engineering, and Dean of the Engineering School

INSTRUCTION in engineering and certain other applied sciences has a unique history in Harvard University, since it has been carried on under five successive and distinct administrative organizations: the Lawrence Scientific School, the Graduate School of Applied Science, the Graduate *Schools* of Applied Science, a coöperative agreement with the Massachusetts Institute of Technology, and the present Harvard Engineering School. Moreover, Harvard College has been interlocked with all five; for it has always provided instruction in mathematics and general studies, and in later years instruction in many fields of science to students in the five successive departments of applied science; and from 1890 to 1912, the Lawrence Scientific School and its immediate successor, the Graduate School of Applied Science, were under the same Faculty as the College.

1. The Lawrence Scientific School, 1847–1906

The Lawrence Scientific School was, down to 1871, the only department of the University in which advanced instruction in the physical and natural sciences was offered; and some of the great departments of science now established under other faculties had their origin, or first significant development, in that school. It was established by vote of the Corporation on February 13, 1847, as 'an advanced school of instruction in theoretical and practical science and in the other usual branches of academic learning, to be called The Scientific School of the University at Cambridge.'[1] The stated object was to provide 'a place of systematic instruction in those branches of science which are immediately connected with the industrial interests of the country, such as chemistry in its various applications to the arts of life; engineering in its several departments; zoölogy and geology with the other kindred branches of natural history.' As no funds were then available, the prosecution of this plan was doubtful until June, 1847, when Abbott Lawrence gave $50,000 for the endowment of the new school, which was promptly renamed 'the Lawrence Scientific School in the University at Cambridge.'

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[1] In Everett's administration, Harvard University was consistently called 'The University at Cambridge,' in imitation of European usage.

About half of that gift was absorbed in the building of Lawrence Hall, and the remainder became a permanent endowment for the professorships of Engineering and of Geology. Abbott Lawrence in 1859 bequeathed another $50,000, and James Lawrence, his son, gave the same amount in 1865. During the period of the Scientific School much additional endowment was received for other departments; but the Lawrence funds, Gordon McKay's bequest (1909), and the Whitney fund of $15,000 (1916) have been the only endowments indelibly marked as a whole, or in part, for instruction and research in engineering.

Louis Agassiz was promptly called to the new chair of Zoölogy and Geology, but it was not until 1849 that the Professorship of Engineering was filled by the appointment of Henry Lawrence Eustis (A.B. 1838), formerly Assistant Professor of Civil Engineering at West Point. Eben Norton Horsford, who had just been appointed Rumford Professor of Chemistry, was immediately transferred to the new School; and during the year 1847–48 he gave a 'special course' in Chemistry which was the first instruction of any kind there offered.

The history of the Lawrence Scientific School logically divides itself into three periods: (*a*) from its beginning to 1871, when instruction in the School was thoroughly reorganized; (*b*) from 1871 to 1890, when the School was combined with the College and the Graduate School under the Faculty of Arts and Sciences; and (*c*) from 1890 to the end of the Scientific School in 1906. The Scientific School had its own faculty and functioned as a separate department of the University from the beginning until 1890. At first, the members of its Faculty were for the most part professors in the College, who had assumed the extra burden of carrying on the new School. In time the Faculty came to be made up chiefly of teachers whose primary affiliation was with the School, and some of the most eminent members of this

Faculty were never members of the College Faculty; but after 1875 the makeup of the Faculty again began to change, and by 1888 all of the members of the Scientific Faculty were also members of the College Faculty.

Until 1873 the requirements for admission were simple. Undergraduate applicants must have attained the age of eighteen years, have had a good common English education, and be qualified to pursue to advantage the desired course of study. For some departments examinations in mathematics through analytic geometry, and for others physics or chemistry, or both, were stipulated; but there were no formal examinations comparable in quantity or variety to those then required in the College. At all times, college graduates were admitted without examination, and special students were always present under some ruling. Beginning in 1873, substantial examinations were required for admission to regular standing. In 1876, the requirements were slightly increased, and after 1888, substitutes for Latin were permitted. Although the requirements for admission to the School were not made equivalent to those of the College until 1903, the additional courses prescribed for a degree in the School, as compared with the College requirements, largely compensated for any differences in admission.

In the opening years of the School only a diploma was given. From 1851 until the School disappeared, the degree of Bachelor of Science was regularly offered.[1] The only other degrees ever awarded by the School were Civil Engineer, Mining Engineer, and Metallurgical Engineer. The degree of Civil Engineer was always a bachelor's degree, and likewise Mining Engineer, until 1879, when that department disappeared from the catalogue for fifteen years. In 1903, Mining Engineer again appeared, and Metallurgical Engineer was established, both as graduate degrees in connection with a fifth year of graduate study in the Department of Mining and Metallurgy. These last two were the only graduate degrees available to students while registered in the Lawrence Scientific School. Candidates for the degrees of Doctor of Science (1872) and Master of Science (1890) were enrolled in the Graduate Department of the University.[2]

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[1] After 1888 the department of study was in most cases either indicated as a subtitle to the degree, or mentioned in the diploma, as, for example, 'Bachelor of Science in Civil Engineering.'

[2] See the chapter in this volume on the Graduate School of Arts and Sciences.

From 1851 to 1871 the degree of Bachelor of Science was offered on the following terms: attendance upon instruction in the School for at least one year, and the passing of a full and satisfactory examination on a group of studies selected by the student with the approval of the Faculty. The examination was usually passed after a residence of from eighteen to thirty months.[1] This degree was probably the first, and for a long time it was the only, degree in the University that was awarded mainly on an examination covering a long period of study.[2] Two hundred degrees were awarded on that basis. In awarding this degree, the distinction *summa cum laude* was made from 1851 to 1869; after that, the three grades of distinction now recognized were in effect. After 1871 degrees were awarded only on the completion of a prescribed course of studies of three or four years; on that basis forty-nine degrees were awarded up to 1890, and after that, nine hundred and fifty. Altogether about twelve hundred degrees were awarded by the School.

The work of instruction was conducted for the first twenty-five years on the assumption that the students were men of serious purpose who were preparing themselves for a professional career in some field of applied science. The choice of studies was optional with the students, subject to the approval of the Faculty; and attendance at lectures was at first voluntary, but later it was made compulsory. The method and scope of instruction varied among the several departments. In general, each student spent most of his time in close personal relations with one teacher in one department, with occasional lectures in allied subjects under other teachers. Each department was more or less self-contained and had its own budget. Excerpts from the catalogues of 1850–51 and 1849–50 will explain the practice then prevailing.

> *Engineering.* Professor Eustis will receive special students to the course of instruction in Engineering, who will give their attendance at the School from 9 o'clock, A.M. to 5 o'clock, P.M. The course will include instruction in: — Descriptive Geometry, with its application to masonry and stone-cutting, the construction of arches, etc. The theory of shades, shadows, and perspective, illustrated by a course of drawing, and mapping in all its branches. Surveying with the use of instruments, and actual operations in the field. The nature and prop-

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[1] C. W. Eliot, in *Atlantic Monthly*, xxiii (1869), 210.

[2] President's *Report* for 1885–86, p. 15.

erties of building materials and their applications to the construction of railroads, canals, bridges, etc.

Chemistry. Professor Horsford will continue to receive special students to the course of experimental instruction in Chemistry, who will give their attendance in the Laboratory from 9 o'clock, A.M. till 5 o'clock, P.M. Excursions will be made in term-time to manufacturing establishments in the neighborhood, where the practical application of Chemistry to the arts may be witnessed.

The other departments were Zoölogy and Geology, under Agassiz; Botany, under Gray; Experimental Philosophy, under Lovering; Anatomy and Physiology, under Wyman; Astronomy, under William C. and George P. Bond; and later, Mineralogy, under Josiah P. Cooke. The Departments of Experimental Philosophy (Physics), Anatomy, Physiology, and Astronomy were later transferred to other parts of the University. There were no other important changes in offerings or methods until 1871, except for the brief career of the School of Mining and Practical Geology.[1] That department of the University was opened 'in connection with the Lawrence Scientific School' in 1865, and lasted only ten years. Its students were enrolled there except for their Senior year, and it had essentially the same faculty, with the addition of Whitney, the first Sturgis-Hooper Professor of Geology, Pumpelly, the first Professor of Mining, and Drown, the first teacher of Metallurgy. The School always had a small enrolment, and disappeared from the Catalogue in 1875, when the Corporation finally obtained full control of Samuel Hooper's endowment. The same facilities in mining and metallurgy were immediately provided in the Lawrence Scientific School, by a four-year course of study in Mining Engineering, leading to the M.E. degree; but no one took that degree between 1875 and 1906.

This period (1847–71) was of great importance in the development of advanced instruction and research in science. From the earliest days of the School the first use of income had been to obtain good teachers; as a result the Faculty was made up of eminent men, leaders and pioneers in their own fields; and instruction was intimate, personal, and inspiring. The facilities for teaching the physical sciences and Civil Engineering were good, and for natural science they were unrivalled. The School was not well organized as a cohesive working unit, but consisted of small separate groups, each consisting of a professor and his own students; it was in fact a tutorial system, with many merits. The great differences of preparation among the students hampered the work of instruction, and at times placed heavy burdens on the teachers; but, on the whole, the students were fairly representative of those at American professional schools in those days. Other things being equal, there can be no serious question as to the relative educational value of daily informal study with such men as Agassiz, Horsford, or Eustis, compared with the didactic instruction in current practice and technique, and the routine laboratory exercises, which for several decades passed muster as applied science.

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[1] See the chapter on Geology in this volume.

Many earnest students, working under such favorable conditions, became leaders in developing science and in its applications, which were prime factors in the effective use of the vast natural resources of this country and in the industrial development which has resulted. Among those who had their scientific training in the School were many prominent engineers and leaders in industry, among them Charles Francis Choate (A.B. 1849, L. S. S. 1850–52), President of the Old Colony Railroad; Lewis Muhlenberg Haupt (L. S. S. 1862–63), member of the Isthmian Canal Commission; Alexander Agassiz (A.B. 1855);[1] Clemens Herschel (S.B. 1860); Bernard Richardson Greene (S.B. 1864); George Staples Rice (S.B. 1870); and some sixty other scientists, most of them college professors, including Joseph LeConte (S.B. 1851), and Nathaniel S. Shaler (S.B. 1862), geologists; Simon Newcomb (S.B. 1858) and Edward C. Pickering (S.B. 1865), astronomers; and John Trowbridge (S.B. 1865), physicist. In this group were five college presidents, including John D. Runkle (S.B. 1851) of the Massachusetts Institute of Technology and Thomas Messenger Drown (L. S. S. 1863–65) of Lehigh University.

Charles William Eliot became president in 1869. During the autumn and winter of 1870–71, at the invitation of the University, representatives of the University and representatives of the Institute discussed 'a series of propositions to bring about the Union at the Institute of Technology, of all the schools of applied science in or near Boston.'[2] The committee for the

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[1] Agassiz was registered in the L. S. S. 1855–57 and 1860–63; he took two S.B.'s: one in Engineering in 1857 and the other in Comparative Zoölogy in 1862; he also studied chemistry and geology in the School.

[2] President's *Report* for 1870–71, pp. 42–43, 75–79.

University first made a proposition which was rejected by the committee for the Institute. The committee for the Institute then made a proposition which was not acceptable to the committee for the University, who 'then made another proposition, which was also rejected.' Finally, the committee for the Institute said that they were 'unable to devise any plan . . . that would satisfy the just expectations of the University, and, at the same time promote the interest of the Institute.' The proposals then considered were similar to those which were discussed in 1897 and in 1904, and the agreement which was actually made in 1914.

Following the termination of these discussions, plans were made, in the spring of 1871, for the reorganization of the Lawrence Scientific School, which went into effect during the next academic year.

> The objects in view were to lengthen the term of residence in the department of engineering, and enlarge the course of instruction in that subject; to consolidate the two chemical laboratories then supported at Cambridge; to make the teaching of physics, both elementary and advanced, an important part of the instruction offered by the School; and to utilize in a systematic way the unrivalled facilities of the University for teaching Natural History.[1]

That reorganization led to radical changes in instruction in science, in both the School and the College. The advanced courses of instruction in the natural and physical sciences, which for many years had been given only in the School, soon became regular offerings in the College, and had their future development there. Instead of the previous informal requirements for a degree in the School, prescribed courses of study, or programmes,[2] were offered after 1871, as follows.

Four-year programmes: (1) Civil and Topographical Engineering; (2) Mining Engineering (1875); (3) Electrical Engineering (1888). Three-year programmes: (1) Practical and Theoretical Chemistry; (2) Natural History; [3] (3) Mathematics, Physics, and Astronomy.[4] These courses were lengthened to four years in 1876. There was also a one-year programme in the elements of Natural History, Chemistry, and Physics, called the Teachers' Course, which lasted only a few years. This was the refuge for the special students of that period.

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[1] President's *Report* for 1870–71, p. 22.

[2] 'Courses of Study' were officially called 'programmes' after 1897, to distinguish them from individual courses.

[3] Courses in Geology and in Biology replaced Natural History in 1888, and Botany and Zoölogy replaced Biology in 1895.

[4] Replaced by Electrical Engineering in 1888.

In the period between 1871 and 1890, when other institutions, having lower requirements for admission, were providing instruction in new fields of engineering as they developed, no such expansion took place in the School; there was an actual diminution when Mining Engineering disappeared. Even when Electrical Engineering was established, it involved no new teachers or additional equipment, because the electrical subjects were given by teachers of physics. The only significant addition to the facilities for engineering was provided by an arrangement with the City of Cambridge for instruction in shopwork at the Rindge Technical School, which is still in force. The majority of subjects prescribed for the programme in Engineering, and the entire content of the other programmes, were provided by the College. By 1886, all the engineering subjects had been made electives for College students, who largely made up the classes in Engineering; and all the members of the Scientific Faculty had become members of the College Faculty. For students who could obtain admission to Harvard College, there was therefore little inducement to enter the School, except to get an Engineering degree, or to study with Eustis or his successor, Chaplin. Moreover, the School held no funds for undergraduate scholarships; and membership in the College was preferred on other grounds.

When enrolment in the School had dropped to fourteen students, in 1886, President Eliot proposed that it should be absorbed in the College, since there was no special work left for the School. This proposal was discussed by both faculties, and seriously considered, together with certain alternatives, at the first reunion of the School's graduates in 1886. No action was taken; and about that time the School began to take a new lease of life. However, the union of Harvard College and the Lawrence Scientific School was already an accomplished fact; it only remained to devise a workable organization without discarding the School. This was effectively accomplished in 1890 by the creation of the Faculty of Arts and Sciences, to have charge of both these Departments of the University, and the Graduate School as well.[1]

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[1] See introductory chapter to this volume, on Government and Administration.

That was a lean epoch from the standpoint of expansion of instruction in the Engineering Sciences, but it was rich in ultimate results. That period was devoted to the building up of strong scientific departments in the University, which were needed to put instruction and research in science on a sound basis. If, for financial reasons, so sharp a discrimination had been necessary, the choice was a wise one; for there is no real separation between pure and applied science. If applied science is taught in such a way that it is not pure science, it is not science at all; and if pure science is taught without reference to its application, it is not really effective.

The last period of the Scientific School was one of marked increase in the scope and variety of instruction, in staff, buildings, and equipment, and in enrolment.

Starting in 1890, with five programmes of study, additional four-year programmes were added: General Course in Science (1891); Anatomy, Physiology and Physical Training (1892);[1] Mechanical Engineering (1893); Mining Engineering (1894, changed after two years to Mining and Metallurgy); Architecture (1894); Science for Teachers (1895); Landscape Architecture (1899); and Forestry (1902). When this period ended, thirteen programmes were being offered. In addition, a fifth year of graduate study was provided in Electrical Engineering (1893), in Mining (1903), and in Metallurgy (1903). All these programmes required at least five full courses a year in term-time, and usually more; in addition, considerable instruction either in surveying or shopwork was required of students in engineering and mining during the summer vacation. The creation of the new programmes necessitated many new subjects, which were all under the Faculty of Arts and Sciences; but the more advanced or professional subjects could not be counted for the A.B. degree. At least three quarters of the work prescribed for every programme, and in some cases all, could be counted for a degree in the College. There was a well-defined scheme for winning both the A.B. degree and the S.B. degree in five years; and some students were able to win both degrees in four years.[2]

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[1] Both were dropped in 1905–06.

[2] Under the Faculty of Arts and Sciences, the Department of Engineering was at first in the Division of Pure and Applied Mathematics, and the Department of Mining and Metallurgy was in the Division of Natural History; eventually both departments became divisions, each chairman reporting directly to the President. After 1902, the Division of Engineering was the third largest under the Faculty in respect to equivalent full-course enrolment.

A laboratory for electrical engineering, built and equipped by a gift of $10,000 from Mrs. Benjamin G. Rotch, was opened in the fall of 1892. In 1893-94 the Rogers Building (or Old Gymnasium), was made into a laboratory for mechanical engineering. A laboratory for testing road materials, designed according to French engineering practice, was also installed there in 1894, for the Massachusetts Highway Commission; it it was the first of its kind in this country. In 1889 the Carey Building, originally built for athletic purposes, was fitted up for the Department of Mining and Metallurgy, the funds being provided from the bequest of Edith Rotch, and by the family of John Simpkins (A.B. 1885). It was renamed the Rotch Building, and was much enlarged in 1901. In the same year Pierce Hall was completed for Engineering, and Robinson Hall for Architecture. The School was well housed and well equipped in its last years.

The Scientific School was one of the first in the United States to establish a summer camp for instruction in surveying, and the very first to relegate to the summer both classroom work and field work in surveying. In 1902 the Engineering Camp was opened on Squam Lake, in the town of Moultonborough, New Hampshire, where the University now owns seven hundred acres of land. The Camp was built originally for instruction in Surveying and Railroad Engineering, which had been given at Martha's Vineyard since 1895; but courses in Mechanics were soon regularly offered there, and later, advanced instruction also, when Engineering came to be conducted on an all-year-round basis. The annual enrolment at the Camp was about one hundred and fifty for many years, and occasionally more, fully half the students being enrolled in Harvard College. A mining camp was also operated for some years at a copper mine in Vermont. All students in the Civil and Mining programmes had to spend eleven weeks at Squam Lake; and students in Mining were required to spend at least six weeks more in mine-surveying and other practical work.

Winfield Scott Chaplin, the successor of Eustis, resigned as Dean and Professor of Engineering in 1891. Shaler was then appointed Dean; and William Hubert Burr became Professor. Burr was captured by Columbia in 1893, when Ira Nelson Hollis, then a chief engineer in the United States Navy, was appointed Professor of Engineering, being the first holder of this

IRA NELSON HOLLIS

ADAMS SMYTH SAUVEUR

THREE HARVARD ENGINEERS

professorship not a civil engineer. He has always been a notable figure in the teaching and professional worlds; he was President of the American Society of Mechanical Engineers in 1914, and President of Worcester Polytechnic Institute from 1913 to 1925. Up to 1891 there had been only one permanent teacher of Engineering in the School; but in the next decade several men were appointed, who later attained distinction, not only as teachers but also as practitioners, investigators, or writers, and who are still (in 1928) on the rolls of the University. For example, there were appointed, in 1890, Lewis Jerome Johnson (A.B. 1887), a pioneer in reinforced concrete design; in 1891, Comfort Avery Adams, one of the first to establish the design of electric dynamos and motors on a rational basis, President of the Institute of Electrical Engineers in 1918–19, and the first dean of the present school (1919); in 1893, Henry Lloyd Smyth (A.B. 1883), a mining engineer, distinguished for his scientific achievements in the field of ore-finding; in 1894, Lionel S. Marks, a leading authority on internal combustion motors; in 1899, Albert Sauveur, who has become a world authority on the metallurgy and metallography of iron and steel; and in 1902, Arthur E. Kennelly, for thirteen years assistant to Edison, President of the American Institute of Electrical Engineers (1898–1900), and distinguished as an investigator and author, especially in the field of electrical transmission and distribution. Shaler as Dean, Hollis in Engineering, and Smyth in Mining and Metallurgy were chiefly responsible for developing the School into one of the large departments of the University, and offering superior instruction. After 1902, the School ranked third in enrolment in the University, being exceeded only by the College and the Law School.

Although no income-bearing funds were added for instruction in engineering and mining during that last period, the funds of the Scientific School were pooled in 1895 with those of the other departments of the Faculty, which resulted in material benefit to the School; moreover, a liberal policy toward the School was adopted in anticipation of future expectations. For it was known to a few persons, as early as 1891, that Gordon McKay had already made a will under which the bulk of his large fortune would ultimately accrue for the benefit of the University; and that thus instruction in applied science would eventually be put on a sound financial basis. Mr. McKay died in 1903; and in his will he directed that, after the payment of certain annuities, eighty per cent of the net income be accumulated until it amounted to a million dollars, and then transferred to the University, and thereafter eighty per cent be paid annually; and the other twenty per cent be held as a sinking-fund reserve until the death of the last annuitant, when the residue of the estate is to be transferred to the University. One million dollars was received in 1909, which, with the annual payments to the University up to July 1, 1928, had accumulated to about $4,200,000. This fund is to be treated as a capital investment by the University, and only the interest on it can be spent. An actuarial computation made in 1917, based on the probability that the trust would terminate in 1956, shows that the total endowment when it is finally in the hands of the University will probably amount to nearly twenty-three million dollars.[1]

Certain other provisions of the will, which bear directly upon this story, are here given:

> The net income of said Endowment shall be used to promote applied science:
>
> *First.* By maintaining professorships, workshops, laboratories and collections for any or all of those scientific subjects, which have, or may hereafter have, applications useful to man, and
>
> *Second.* By aiding meritorious and needy students in pursuing those subjects.
>
> Inasmuch as a large part of my life has been devoted to the study and invention of machinery, I instruct the President and Fellows to take special care that the great subject of mechanical engineering in all its branches and in the most comprehensive sense, be thoroughly provided for from my Endowment.
>
> I direct that the President and Fellows be free to provide from the Endowment all grades of instruction in applied science, from the lowest to the highest, and that the instruction provided be kept accessible to pupils who have had no other opportunities of previous education than those which the free public schools afford.

Directions are also given as to details, such as the salaries of professors, providing them with suitable assistance, and ensuring modern equipment of the best design and quality. The testator directs that the President and Fellows be 'free to erect buildings for the purpose of this endowment, and to purchase sites for the same, but only from the income of the endowment.' Then follows: 'Finally, I request that the name Gordon McKay be permanently attached to the professorships, buildings, and scholarships, or other aids for needy students which may be established, erected, or maintained from the income of this endowment.'

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[1] Annual 80 per cent payments to Harvard, $9,244,600; accumulation of 20 per cent reserve fund, $8,379,400; capital fund, $5,325,000.

In April, 1897, the Harvard Corporation initiated a second attempt to effect an alliance with the Institute. Prolonged conferences between representatives of both institutions resulted in a plan involving engineering, mining, metallurgy, and architecture, which provided that the Institute be 'the associated school and regarded as the only school of industrial science in connection with the University.' The Harvard Corporation approved the plan proposed, with certain interpretations; but as the latter were not acceptable to the Institute, the negotiations came to an end in January, 1898.

A third attempt at a union was started in May, 1904, when the President of the Institute wrote to President Eliot, stating that the Institute desired to ascertain whether an arrangement could be made with the University for a combination of effort in technical education. The committees of conference appointed to represent the two institutions held many joint meetings, which resulted in a tentative plan of agreement, which both corporations expressed a willingness to consider, provided that favorable decisions could be secured from the Supreme Judicial Court as to whether the Institute might sell a part of its land on Boylston Street in Boston, and also as to whether such an agreement might legally be carried out by both institutions. The proposal considered at that time was like the agreement made in 1914, which will be quoted presently, except that the Institute was to erect its new buildings about where the Harvard Business School is now located. The negotiations came to an end in October, 1905, because of an unfavorable decision of the Court concerning the Boylston Street land. It is doubtful whether, in any case, the proposed agreement could have succeeded against the vigorous opposition of teachers and graduates of the Institute, and the hostility of Dean Shaler. He asserted that to abolish the Lawrence Scientific School and to divert McKay funds to another institution would be a breach of trust.

The annual enrolment in the Lawrence Scientific School is tabulated below. The dates indicate the academic year then begun.

No new students were admitted to take a programme of the School after October, 1907; and the last degree was awarded in 1910. As so much of the engineering work was open to College students, many of them prepared for careers in engineering without ever enrolling in the Scientific School. Up to 1871 a total number of 856 individuals had been enrolled, over half of them for not more than one year; from 1871 to 1890, only 334 individuals in all were enrolled. For the first twenty-five years all students were labelled 'Special.' That term was not then intended to imply inferior or inadequate preparation for study in the University, but to denote men who were specializing for a definite purpose. The idea of a professional school for college graduates, or other men of superior education, was strong in the minds of the founders. Indeed, more than 170 persons had already received some degree before joining the School; and many others who enrolled were both prepared and competent. On the other hand, there were many who were lacking in preparation,

Year	No.	Year	No.	Year	No.	Year	No.
1847	5	1863	76	1879	16	1895	340
1848	12	1864	75	1880	37	1896	368
1849	23	1865	79	1881	30	1897	411[3]
1850	62	1866	58	1882	25	1898	415
1851	69	1867	49	1883	26	1899	495
1852	48	1868	41	1884	28	1900	507
1853	54	1869	43	1885	22	1901	549
1854	64	1870	35	1886	14	1902	584
1855	56	1871	27[1]	1887	21	1903	548
1856	52	1872	40	1888	35	1904	530
1857	67	1873	42	1889	65	1905	504[4]
1858	69	1874	29	1890	88[2]	1906	204[5]
1859	62	1875	34	1891	118	1907	96
1860	61	1876	29	1892	181	1908	39
1861	57	1877	22	1893	280	1909	13
1862	56	1878	17	1894	308		

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1. School reorganized.
2. Faculty of Arts and Sciences established.
3. The figures up to 1897 are copied from Dean Shaler's Report for 1896–97.
4. 301 students were registered for engineering, mining, metallurgy, and chemistry. Compare the next statistical table, page 429.
5. Graduate School of Applied Science established.

ability, or diligence, or were wholly unfit. Special students do not appear in the Catalogue between 1871 and 1876, as they were enrolled in the one-year course for teachers. The specials far outnumbered the regular students from 1880 to 1894, when they began to diminish rapidly, and after 1897 the proportion of special students annually averaged less than twenty per cent of the total enrolment. The regulations governing the admission of special students [1] were intended for desirable, and presumably competent, applicants from those secondary schools which were not accustomed to prepare boys for the Harvard examinations, which then meant practically all the high schools, and most of the distant private schools. Students thus admitted were expected eventually to make up their admission deficiencies. Many of them did attain regular standing and were graduated. Many others, however, having acquired cheaply all the privileges which they valued, did not recognize any further serious responsibilities. In spite of some serious objections, the practice of admitting special students served to draw from widely scattered districts many desirable boys, who because of deficiency in early education were not able to pass the admission examinations; to build up enrolment in the School; to add a large group of loyal and helpful alumni; and to provide much additional, sorely needed income.

2. The Graduate School of Applied Science 1906–1912

During the year 1905–06 there were effected plans for another reorganization, which Eliot stated [2] were stimulated by the failure to bring about an affiliation with the Institute, and by the approach of the time when income would be available from the bequest of Gordon McKay.

In March, 1906, the Governing Boards adopted the following vote:

> That there be established in Harvard College the degree of Bachelor of Science without designation of any field of study, the requirements for admission of students intending to become candidates for this degree to be the same as the present requirements for admission to the Lawrence Scientific School, and the requirements for graduation to be

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[1] Identical regulations were adopted by the College in 1880.

[2] Report for 1905–06, p. 20.

the same as the requirements for the degree of Bachelor of Arts in respect to number of courses required, grade of work demanded, and length of residence;

That there be established in Harvard University a Graduate School of Applied Science;

That the subjects in which degrees may be granted in this Graduate School be, for the present, Engineering, Mining and Metallurgy, Architecture, Landscape Architecture, Forestry, Applied Chemistry, Applied Biology, and Applied Geology;

That a Bachelor's degree or its equivalent be required for admission to the Graduate School of Applied Science;

That the degree of Bachelor of Science with designation of the field of study on completion of any one of the present four-year programmes of the Lawrence Scientific School continue to be offered until the further order of this Board.

The situation resulting from the reorganization of 1906 was as follows:

The Graduate School of Applied Science replaced the Lawrence Scientific School in the Faculty of Arts and Sciences. Recommendations for degrees in the new School originated with the divisions or departments.

The four-year programmes leading to the S.B. with designation of field, which were then being offered in the Scientific School, were made available in the College to students who had been enrolled in the Scientific School, and also to new students. The new S.B. in the College differed from the A.B. only in that neither Latin nor Greek was required for admission.

The fields of study offered in the new graduate school were: Civil Engineering, Mechanical Engineering, Electrical Engineering, Mining Engineering, Metallurgical Engineering, Architecture, Landscape Architecture, Forestry, Physics, Chemistry, Zoölogy, and Geology; and after 1911, Sanitary Engineering. The programme of study for the degree in each of these fields usually required two years for graduates of Harvard College under the conditions then existing, and commonly three years for graduates of other colleges of liberal arts. The subjects prescribed for a degree were in essence the fourth year of the old programmes of the Scientific School, plus an additional year of graduate work. Preparation equivalent to the work of the first three years of one of those programmes was assumed.

The degrees offered during 1906–07 were Bachelor in Civil, Mechanical, or Electrical Engineering, Mining Engineer, Metallurgical Engineer, Bachelor in Architecture and in Landscape Architecture, and Master of Science in the other programmes. In 1907–08 the degrees of Master in Civil, Mechanical, or Electrical Engineering, in Architecture, in Landscape Architecture, and in Forestry replaced the corresponding Bachelor's degrees of the previous year. The effect of continuing the four-year programmes of the Lawrence Scientific School in the College provided the alternatives of (*a*) pursuing a four-year programme in applied science in the College, or (*b*) of studying three or four years in the College, and two years or one year in the Graduate School of Applied Science for two degrees.

Shaler died in April, 1906, and was succeeded by Wallace Clement Sabine (A.M. 1888), as Dean of the Lawrence Scientific School and of the Graduate School of Applied Science.

In October, 1907, the Governing Boards closed the four-year undergraduate programmes of the Scientific School to further new enrolment, but permitted those who had already registered in such programmes to complete the requirements for a degree. The last degree of this kind was awarded in June, 1910. Until that time the name of the Lawrence Scientific School continued to be mentioned in the Catalogue; but the School came to its official end in 1906.

The following table shows the result of the changes of 1906 and 1907 on the enrolment in applied science to 1914. The dates indicate the academic year then begun.

	1906	1907	1908	1909	1910	1911	1912[1]	1913
Lawrence Scientific School students	204	96	39	13	0	0	0	0
Graduate School of Applied Science students.	36	63	70	87	133	144	148	152
	240	159	109	100	133	144	148	152

[1] Graduate *Schools* of Applied Science.

During the period of the Graduate School important additions were made to the teaching staff in engineering, mining, and metallurgy: in 1904, Edward Dyer Peters (M.D. 1877), an eminent copper metallurgist, made Gordon McKay Professor of Metallurgy in 1909; in 1909 George Fillmore Swain, Gordon McKay Professor of Civil Engineering, eminent as a teacher and consulting engineer, and President of the American Society of Civil Engineers in 1913; in 1909, Harry Ellsworth Clifford, already distinguished as a teacher and investigator, made Gordon McKay Professor of Electrical Engineering; in 1911, George Chandler Whipple, a pioneer in sanitary engineering and one of its most eminent practitioners, was appointed Gordon McKay Professor in Sanitary Engineering. During the same period a group of younger men who have since attained distinction were attached to the Faculty, among them Louis Caryl Graton in Mining Geology, and Harvey Nathaniel Davis (A.M. 1903),[1] first in Physics, and later in Mechanical Engineering. Thus by 1914 an able group of teachers had been gathered in Engineering, Mining, and Metallurgy. A number of younger men of ability and promise have been added to the staff in later years.

During the year 1911–12 funds were given by Harriet Otis Cruft to build a high-tension and high-frequency electrical laboratory for the Department of Electrical Engineering, which was named the Cruft Memorial Laboratory. Before it was built, the agreement with the Institute was made, and the plans were accordingly changed. The building was eventually constructed and equipped for instruction and research in high-frequency electrical work, under the direction of George Washington Pierce and Emory Leon Chaffee, Professors of Physics in the Faculty of Arts and Sciences. Under the leadership of these men the Cruft Laboratory has acquired a unique and enviable position in the field of electrical communication, which includes the telephone, the telegraph, the radio, and the hydrophone. Some of the most important advances in these fields are based on the results of investigations made in this laboratory. The Laboratory is now a joint enterprise of the Department of Physics and the Engineering School, and is largely supported by McKay income. Its permanent staff are members of both the departments; and usually about half of the students working in the laboratory are enrolled in the Engineering School.

As increased income has become available, the laboratory facilities have been expanded and improved. In developing the laboratories it has never been the policy to install large commercial units, or to develop elaborately equipped workshops for teaching routine mechanical operations. Twenty-five years ago this policy was generally deemed so essential that the expense of building suitable engineering laboratories in the University was mistakenly assumed to be prohibitive. Elsewhere most of these large units have been discarded; but a few have been retained for advertising purposes. The use of small laboratory units is now the common practice. Although there are larger laboratories in other institutions, there are none superior in scope, variety, and quality of equipment for the fields in which instruction is being offered.

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[1] Now President of Stevens Institute of Technology.

3. The Graduate Schools of Applied Science
1912–1914

During the year 1911–12 another reorganization, which officially went into effect in September, 1912, was planned. The Graduate *School* of Applied Science, under the Faculty of Arts and Sciences, was replaced by the Graduate *Schools* of Applied Science under a separate Faculty, in which the former Divisions or Departments were organized into several Schools, as follows: School of Engineering, Mining School, School of Architecture and Landscape Architecture,[1] School of Forestry, and School of Applied Biology (Bussey Institution).[2] Accompanying this reorganization, the Engineering offering in the College was reduced to six courses, designated Engineering Sciences.

This radical reduction increased the normal period of residence and study for both a bachelor's degree and a degree in Engineering or Mining to seven years in all. This length had already proved so formidable to graduates of other colleges that the School of Engineering was operated for several years on an all-year basis in order to reduce the period of residence for a professional degree. This arrangement did not, however, prove to be entirely acceptable either to teachers or to students. Nor could a seven-year period, following graduation from a secondary school, be deemed to fulfill the directions laid down in the will of Gordon McKay. In 1914, following the making of an agreement with the Massachusetts Institute of Technology to coöperate in instruction and research in engineering and mining, the Faculty of the Graduate Schools of Applied Science was dissolved.

The abolition of the four-year programmes of the Lawrence Scientific School has proved to be a costly mistake. The resulting loss of clientèle has not yet been recovered, to say nothing of the sacrifice of the development that would have taken place if the Graduate School had been built upon the then excellent undergraduate work of the Lawrence Scientific School, as Shaler and Hollis urged. Indeed, the legislation of 1906 definitely provided such a plan; but the foundations for a sound development were removed by abolishing the undergraduate programmes in 1907, the year following Shaler's death.

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[1] See Professor Edgell's chapter in this volume.

[2] See Dean Wheeler's chapter in this volume.

Eliot's ideal of a school for graduates of colleges and scientific schools was shared by many members of the Faculty. They believed that the demand for engineers would greatly increase, especially in industry, which was already developing with great strides; and that the best education was a long university course ending in highly specialized study. The growth in the demand for engineers did far exceed any possible expectations; but the demand was for Bachelors, not Masters in Engineering. The expectation that the engineer of the future would function largely in a professional capacity was based on a mistaken forecast of the demand of industry for scientifically trained men. Engineering graduates in increasing numbers have been taken into industry, where many are filling positions of responsibility, scientific, technical, or administrative; but engineering graduates have reached such positions only after considerable experience and practical training in the industries themselves. There is also an increasing demand for specially trained experts in design, research, teaching, and advice; but all positions of this character would probably not employ more than a quarter of the engineering graduates.[1]

Engineering graduates seldom enter directly upon an individual professional career, and even in private practice they must usually function as a part of a large organization. Experience and practical training, as well as post-graduate study, are necessary, even for those who are to become experts in research and design. For the larger group who will eventually fill positions involving executive responsibility, a considerable time must be allowed after graduation for training in technique, and for personal adjustment to actual working conditions which cannot well be taught in the classroom. Hence the four-year engineering curriculum has come to be generally accepted as the norm, and the small number enrolled for graduate study in applied science up to 1914 [1] is easily understood.

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[1] There are more than one hundred and fifty engineering colleges in the country to-day, with an enrolment of some sixty thousand students, about 85 per cent of them being enrolled in Civil, Mechanical, and Electrical Engineering, Mining, and Metallurgy, and Chemistry. Fully two thirds of the graduates of engineering schools during the last thirty years are now filling executive or supervisory positions; and younger men in increasing proportion are preparing themselves for that kind of work. Nearly 98 per cent of the students enrolled in the engineering colleges of the present day are studying for a Bachelor's Degree, and only a few of them have previously graduated from a college of liberal arts.

4. Coöperative Agreement with the Massachusetts Institute of Technology, 1914–1919

About the time that the Graduate Schools of Applied Science were established, the Massachusetts Institute of Technology decided to erect its new buildings in Cambridge; and a question was then raised whether an arrangement could not be made between the two institutions to provide instruction for graduates of colleges and of scientific schools on some such basis as was then in operation at Harvard. It was soon discovered that no satisfactory arrangement limited to graduates could be made, and the scope of the investigation was enlarged to include undergraduate work. Negotiations were brought to a successful conclusion in January, 1914, by an agreement to coöperate in the conduct of instruction and research in those fields which were, at the time, being covered in the School of Engineering and in the Mining School at the University. The nature of this agreement can best be understood by a verbatim copy of the agreement, which is printed below.

AGREEMENT BETWEEN THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY AND HARVARD UNIVERSITY

In this agreement, 'the Institute' means the Massachusetts Institute of Technology, and 'the University' means Harvard University. It is understood that any action of the President and Fellows of Harvard College shall require the consent of the Board of Overseers wherever such consent is necessary under the laws governing the University.

I. The University and the Institute shall be unaffected in name, organization, title to and rights over property, or in any other way not specifically mentioned in this agreement.

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[1] Columbia University started a similar experiment in 1914, with like results.

II. The University and the Institute shall coöperate in the conduct of courses leading to degrees in Mechanical, Electrical, Civil and Sanitary Engineering, Mining and Metallurgy, and in the promotion of research in those branches of Applied Science. The courses and research shall be conducted in accordance with the provisions of this agreement and on the site in Cambridge recently acquired by the Institute bordering on Massachusetts Avenue and the Charles River Embankment or on any other site that may be agreed upon should future conditions render an extension or change of site desirable.

III. Subject to the reservations hereinafter set forth the University shall devote to the purposes referred to in Section II the net income of all funds that are credited on its books to the Lawrence Scientific School; also the use of all machinery, instruments, and equipment that are suited to these purposes and that the University does not in its opinion need more urgently for other purposes; also not less than three-fifths of the net income of the Gordon McKay Endowment; also the income of all property that it may acquire hereafter for the promotion of education or research in the branches of Applied Science referred to in Section II; also such further sums as it may from time to time feel able to contribute.

IV. Subject to the reservations hereinafter set forth, the Institute shall devote to the purposes referred to in Section II all funds, or the income of all funds, that it now holds or hereafter acquires for the promotion of education or research in the branches of Applied Science mentioned in that section, and in addition to this as much of the funds, or the income of funds, that it holds for general purposes as is not in its opinion more urgently required for other purposes.

V. Students' fees for courses in the branches of Applied Science mentioned in Section II shall be devoted to the purposes referred to in that section. These fees shall for the first ten years be deemed to be contributed by the two institutions in the proportion of the numbers of the students following these courses in the Institute and in the University's Graduate Schools of Applied Science, respectively, during the year 1913–14. At the end of ten years a different arrangement shall be made, if, in the opinion of the two Corporations, it appears to be more equitable. The fees of students pursuing courses in the subjects referred to in Section II in the University's Graduate Schools of Applied Science at the time when this agreement is adopted shall be unaffected by any change brought about by this agreement. For all other students the amount of the fees for complete courses leading to those degrees of the Institute and of the University that are granted through the operation of this agreement shall be $250 per annum until changed by agreement between the two Corporations. The amount of fees for partial courses and for research shall be determined as may be agreed upon from time to time.

VI. The funds available for education and research in the branches of Applied Science referred to in Section II shall be expended through the Bursary of the Institute in the payment of salaries, the maintenance of scholarships, the care of grounds, and the erection and maintenance of buildings and equipment or otherwise as may be agreed upon from time to time, it being expressly provided that all proposed appropriations shall be approved by the Corporation that supplies the funds, and that buildings shall be erected only from the share of the funds supplied by the Institute.

VII. All members of the Instructing Staff in the departments of Mechanical, Electrical, Civil and Sanitary Engineering, Mining and Metallurgy, who give instruction in courses leading to the degrees both of the University and of the Institute, shall be appointed and removed by the Corporation that pays their salaries after consultation with the other Corporation.

VIII. All students registered at the Institute in the various numbered professional courses covered by Section II that lead to degrees of the University shall be deemed to be prospective candidates for such degrees, unless they signify a contrary intention, and shall be entitled to the same rights and privileges as students in the professional schools of the University.

IX. The President or Acting President of the Institute shall be the executive head for all the work carried on under this agreement. As an evidence of his responsibility in directing it he shall make an annual report to both Corporations. When any future President or Acting President is to be selected, the President or Acting President of the University shall be invited to sit with the committee that recommends the appointment of a President or Acting President to the Corporation of the Institute.

X. As soon as this agreement goes into effect, the Faculty of the Institute shall be enlarged by the addition thereto of the professors, associate professors, and assistant professors of Mechanical, Electrical, Civil and Sanitary Engineering, Mining and Metallurgy, in the University's Schools of Applied Science. These persons shall acquire the titles and privileges of the same rank in the Institute while retaining their titles and privileges in Harvard University, and the terms and conditions of their employment and their salaries shall be unaffected by the change. The professors, associate professors, and assistant professors of the Institute in the departments of Mechanical, Electrical, Civil and Sanitary Engineering, Mining and Metallurgy, shall acquire the titles and privileges of the same rank in Harvard University while retaining their titles and privileges in the Institute, and the terms and conditions of their employment and their salaries shall be unaffected by the change. All professors, associate professors, and assistant professors appointed under the operation of Section VII shall have the titles and privileges of professors of the University and of the Institute, including the right to benefit from the pension systems of both institutions.

Additions to the Faculty of the Institute shall be made by the appointment of professors, associate professors, or assistant professors under the operation of Section VII, or by the Corporation of the Institute for other purposes. The Faculty constituted as indicated above shall, subject to such directions as may be given by the Corporation of the Institute, prescribe the courses and conditions of entrance thereto leading to all degrees granted by the Institute. The same Faculty shall, subject to such directions as may be given by the Corporation of the University, prescribe the courses and conditions of entrance thereto leading to all degrees granted by the University under the operation of this agreement.

XI. Degrees shall be conferred by the Institute and by the University acting separately on the recommendation of the Faculty referred to in Section X.

XII. It is expressly provided that, as regards the funds and property of the University and of the Institute respectively referred to in Sections III and IV, this agreement shall be subject to any special terms and requirements upon which such funds and property may be held; and any property or funds that may be held at any time by either Corporation under such terms and restrictions as would prevent their use precisely as is indicated in this agreement, shall, nevertheless, be used by the two Corporations respectively for the support, benefit or encouragement of a coöperative effort in the field of education and research in engineering and mining in such manner as may be permissible or in accordance with the trusts upon which they may be held.

XIII. Whereas, doubts might arise as to the legal effect of an omission from this agreement of any provision for its termination, it is hereby provided that the agreement may be terminated either by the University or by the Institute, but that no termination shall be made except upon notice from one party to the other of at least five years unless a shorter time be mutually agreed upon.

XIV. This agreement shall take effect when finally adopted and approved by the Corporation and Board of Overseers of the University and the Corporation of the Institute; and the coöperation referred to in Section II shall begin when the Institute is ready to open courses in Engineering and Mining on the site in Cambridge mentioned in that Section.

In February, 1915, certain minor changes were made in the original text. Soon after this agreement was published, grave doubts were expressed as to the legality of using McKay income at the Institute. The Harvard Corporation therefore filed a bill with the Supreme Judicial Court of Massachusetts, for instructions as to whether the Corporation could lawfully carry out the agreement so far as respected the property received by it under the deeds of trust and the will of Gordon McKay. In November, 1917, the Court handed down its undivided opinion that the terms of the agreement were contrary to the intentions of Gordon McKay as expressed in his will.

When the Faculty of the Graduate Schools of Applied Science was dissolved, Architecture and Landscape Architecture were placed in charge of the Faculty of Architecture; the Bussey Institution was continued under its own Faculty; and the School of Forestry was discontinued, its work being divided between the School of Business Administration and the Bussey Institution.

Although the arrangement was not legally to go into effect until the Institute should move into its new buildings in Cambridge, and in no case finally until the Court decision was received, some of the Harvard teachers began part-time service under the plan in the fall of 1914. Two years later they began full-time duty at the new buildings; and most of the University's laboratory equipment for engineering and mining was set up there. The buildings which had been used for engineering and mining were then assigned to other uses; but shortly after the United States entered the war, the Navy Department established at the University a large school for training radio operators, which required the use of many University buildings, including Pierce Hall, which was not evacuated until January, 1919. The coöperative effort was tentatively carried on at the Institute until the Court made known its decision, when steps were promptly taken for a reorganization. As the academic year of 1917–18 was then well under way, and as the engineering buildings were occupied by the Navy until several months after the end of the war, the Harvard teachers remained at the Institute during 1917–18, and a few remained there through 1918–19;

but no new students were admitted to study under the agreement, after 1917. Under the terms of the agreement, the University conferred about three hundred Bachelor's Degrees and about fifty higher degrees.

The question of reorganizing instruction in engineering and mining at the University, in accordance with the decision of the Court, was carefully studied by the instructing staff and the Governing Boards, who, with the advice and help of many other interested persons, drew up a plan that appeared to meet all legal requirements, but did not preclude all possible coöperation with another institution; and this was adopted in 1918. An engineering school was reconstructed in the University, with its own faculty, and named the Harvard Engineering School. Courses in Harvard College were to be utilized so far as was consistent with the curriculum of the School. All grades of instruction from the lowest to the highest were to be provided, and to be kept directly accessible to pupils from the public schools. Courses of study in Mechanical, Civil, Sanitary, and Electrical Engineering, Mining and Metallurgy, and Industrial Chemistry were to be offered at the start. The requirements for admission of undergraduates to the School were to be the same as for admission to Harvard College. The work of the School was to be conducted in the classrooms and laboratories of the University; but arrangements might be made for the use of facilities of other institutions, or for the interchange of instruction, but for a period of only one year at a time. The degrees of S.B. with designation of field, of S.M. or its equivalent,[1] and of S.D., were to be awarded. The Faculty was given discretion to allow credit for instruction received elsewhere, and to open its courses to students of other institutions. Under such a plan negotiations were opened with the Institute, with a view to providing some form of coöperation that would meet the approval of the Court. It was found impossible, however, to arrive at any agreement that was financially satisfactory to both institutions on the basis of a separate Harvard faculty.

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[1] The degree of Mining Engineer was used until 1925, and Metallurgical Engineer until 1928.

5. The Harvard Engineering School, 1919–1929

The Harvard Engineering School was opened in 1919 without any outside connection. Instruction on a partial schedule was started in January of that year in the University Museum. During the summer the laboratory equipment was brought back from the Institute; the laboratories in Pierce Hall and the Rotch Building were remodelled and modernized, and the Gordon McKay Laboratory was added. This last is a large wooden building purchased from the Navy, which was made into a laboratory for steam engineering, internal combustion motors, hydraulics, and the testing of materials. The laboratory space was thus greatly increased; and considerable new apparatus was provided. In September the Engineering School was ready to give its full schedule of instruction.

During the year 1919–20 four-year programmes were provided in the seven departments[1] named in the plan of reorganization, as well as graduate instruction in the same fields. Some changes and additions were made in subsequent years. At the present time (1929) the instruction offered by the School is organized in the following manner:

1. Four-year programmes in Mechanical, Electrical, Civil, Mining, and Electric Communication Engineering; Sanitary Chemistry, and Industrial Chemistry. These are designed to provide a sound, broad, scientific foundation.

2. Five-year combined programmes in Engineering and Business Administration, with options in Mechanical, Electrical, Civil, or Mining Engineering, which are offered in coöperation with the Graduate School of Business Administration. These are designed to combine an engineering education with the study of business principles, for the purpose of widening the opportunities of engineering graduates in industry.

The four-year and five-year programmes are arranged for undergraduates as well as for graduates of colleges of liberal arts.

3. Graduate study and training for research is provided in all the Departments in which the four-year programmes are offered. There are also two options in Sanitary Engineering:

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[1] See page 438.

State and Municipal Sanitation, and Industrial Sanitation; and also two options in Metallurgy: Ferrous, and Non-Ferrous.

The first two years of the four-year and five-year programmes consist of courses offered in Harvard College, such as Mathematics, Science, and general studies. Courses in Engineering and Business are segregated in the later years. The sharp differentiation in the subject-matter of the earlier and later years, while involving certain minor disadvantages, is made for important reasons: to give engineering students as much contact as possible with the College; to encourage them to extend their general education and to take an arts degree before beginning their engineering studies; and especially to give them a chance to determine what they are best fitted to do, and, if desirable, to change their plan of study without incurring needless loss of time.

In order to provide an opportunity for students to obtain experience and practical training that would bring them into direct contact with the various problems of industry, a plan of industrial coöperation[1] was started in the school in 1920. The scheme provided for three bi-monthly periods of industrial employment, and four similar periods of classroom instruction between the end of the Sophomore year and the beginning of the Senior year. The work was optional, and it was limited to Juniors in Civil, Electrical, and Mechanical Engineering. At first, both the coöperative and the all-resident students had identical classroom instruction, which was given intensively, one-half of the usual subjects being taken in each period, but at a double rate. For the coöperative students, the plan proved to be a handicap to self-support; because of the short vacations, it caused unhappiness to those whose homes were at a distance; and failure in a single subject usually meant either a postponed graduation, or the giving up of the outside work. The effectiveness of instruction was so diminished under the double-rate schedules that eventually separate courses, given at the usual rate, were provided for the all-resident students. This meant giving every Junior subject three times each year. The enrolment in the work was large at first, but rapidly diminished. The plan was dropped in 1923.

In 1928 the degrees of S.B. in Mechanical Engineering, S.B. in Mechanical Engineering and Business Administration, and

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[1] It was based on the plan in operation at the University of Cincinnati.

S.M. in Mechanical Engineering, and the corresponding degrees in the other engineering departments were simplified to S.B. in Engineering, S.B. in Engineering and Business Administration, and S.M. in Engineering, with a provision for indicating the department on each diploma. At the same time the degree of S.M., without designation, was provided for graduates of colleges of liberal arts who enter the school with advanced standing and complete one of the four-year or five-year programmes. Heretofore such men had been able to obtain only a second bachelor's degree after studying in the school for at least two, and occasionally three years, which was not satisfactory, especially to those who came from a distance to obtain a higher degree.

The annual enrolment in the Harvard Engineering School to 1928 is tabulated below. The dates indicate the academic year then begun.

	1919	1920	1921	1922	1923	1924	1925	1926	1927
Undergraduates	85	168	198	207	207	212	232	222	198
Graduates									
of Colleges	35	48	53	32	27	23	18	12	22
of Engineering Colleges	12	19	19	26	27	26	40	38	67
	132	235	270	265	261	261	290	272	287

Thirty-two states and seventeen foreign countries were represented in the enrolment for 1927–28.

The total number of students now enrolled in the School is about equal to the total enrolment in engineering, mining, metallurgy, and chemistry in the Lawrence Scientific School when it was abolished in 1906. At that time they were all undergraduates; now nearly one third of them are graduates of colleges or of engineering schools.

The instruction offered in the Engineering School and the roster of its students do not give a complete picture of the professional instruction in the natural and physical sciences which is now provided in the University. The offerings of the Departments of Geology, Physics, and Chemistry, for example, range from the most elementary instruction to the highest type of specialized instruction and research. Many graduate students in Geology, who are preparing for a professional career in the mining industry, are getting much of their instruction under the professors of Mining in the laboratories of the Rotch Building; and the Departments of Physics and Chemistry annually graduate a large group of men who enter directly upon professional careers in the industries. The coöperation among the departments of science at the University is cordial and close. And the artificial line between pure and applied science has practically disappeared, because it is realized that the present-day achievements in engineering have been made possible only by the great advances in knowledge of the fundamental laws of science.

XXVII. THE SCHOOLS OF ARCHITECTURE AND LANDSCAPE ARCHITECTURE

1894–1929

By George H. Edgell, Ph.D.

Professor of Fine Arts and Dean of the Faculty of Architecture

ALTHOUGH many people contributed to the making of the Schools of Architecture and Landscape Architecture, Harvard owes the creation of these departments primarily to three men: President Eliot, Professor H. Langford Warren, and Mr. Nelson Robinson of New York.

Instruction in the fine arts, including Architecture, had been offered in Harvard since the lectures of Professor Charles Eliot Norton, as early as 1874.[1] The first instruction in architecture alone, however, was offered in 1893 by Professor H. Langford Warren, afterward to become Dean of the Faculty of Architecture. In the winter of 1893–94 Professor Warren gave courses in the History of Greek and Roman Architecture. The success of these was so immediate that, in the following year, courses in Mediaeval Architecture, Architectural Design, and Drawing were added to the curriculum. In 1895 the offering included the History of Ancient, Mediaeval, and Modern Architecture; Elementary, Intermediate, and Advanced Architectural Design; Descriptive Geometry; and Freehand and Architectural Drawing. Indeed, there was a nearly balanced technical programme in Architecture except for the very important structural and engineering subjects which should be included in any architectural school. The curriculum was under the general charge of Warren, who taught History and Design. He was assisted by G. F. Newton and J. W. Bemis (A.B. 1885), who taught Architectural Design, and by V. A. Wright, who taught Descriptive Geometry, Shades and Shadows, and Perspective. Under the general curriculum of the Department were included courses in English, French, German, Fine Arts, Mineralogy, and Modelling. No substantial additions were made until 1897, when a course in Building Construction and Carpentry was added by Newton, and a course in Modelling Architectural Ornament by Mr. Andrew Garbutt. Thus, in 1897, practically a complete curriculum in Architecture was offered by the University, although at that time the instruction was for undergraduates, and the Department was only a subdivision of the Faculty of Arts and Sciences.

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[1] See Professor Chase's chapter on the Fine Arts, above.

The initiative in this work was taken by Dean Warren. He was ably supported and encouraged by President Eliot, whose many-sided interests included an unusual appreciation of the beauty and importance, not only of architecture, but of landscape architecture, This interest was stimulated by the fact that his son, Charles Eliot (A.B. 1882) at this time a member of the firm of Olmsted, Olmsted and Eliot, had become one of the pioneers of landscape architecture in the United States. Indeed, it was supposed that he would take charge of teaching a course in landscape architecture and build a school in Harvard, but his useful career was terminated by death in 1897.

The teaching of landscape architecture was therefore delayed, but never forgotten, and in 1901 a course in the History and Principles of Landscape Design was offered by Frederick Law Olmsted, Jr. (A.B. 1894) and Arthur A. Shurtleff (S.B. 1896), with occasional lectures by Professors Goodale and Shaler. Olmsted and Shurtleff also offered in the same year two courses in the Practice of Landscape Design. The year 1901, therefore, marks the inception of the School of Landscape Architecture. It will be easier, however, to discuss the development of the School of Architecture first, and then trace that of the School of Landscape Architecture.

Meanwhile, though the curriculum and the instruction had grown rapidly, and almost to completion, the physical equipment for the Schools was almost non-existent. President Eliot realized that no department could be a success without an elaborate technical equipment and an adequate endowment, and he was on the alert for an opportunity to provide this for the University. The opportunity came in 1899. A member of the class of 1900, Nelson Robinson, Jr., had manifested an interest in architectural design and in landscape architecture. He was the only son of Mr. Nelson Robinson, of New York. He was a youth of promise, and popular with his fellows. He died, however, while in College. His father determined to create a memorial to him. It took the form of one of the most gracious as well as generous gifts which the University has ever received. Personally, Mr. Robinson had no interest in architecture. He

HERBERT LANGFORD WARREN

JAMES STURGIS PRAY

knew, however, his son's interest and his son's love for Harvard. He went, therefore, to President Eliot and told him that he was prepared to make a gift to the University, large enough to represent a real sacrifice on his part and therefore a real memorial to his son. He specified no purpose for this gift, but asked President Eliot what the University needed. It was President Eliot's suggestion that the most appropriate memorial would be the creation of a School of Architecture and Landscape Architecture. Mr. Robinson consented, and immediately provided for the erection of a practical, beautiful, and fully equipped building, as well as an endowment to run the School. McKim, Mead and White, then the most eminent firm of architects in America, were employed; and in 1901 Nelson Robinson Jr. Hall, the home of the Schools, was completed. It is characteristic of Mr. Robinson that only after long persuasion was he willing even to allow the name of Robinson to be given to the building.

The Department, now reasonably complete from both the educational and the physical point of view, was made an undergraduate department of the Lawrence Scientific School. It was not yet, however, entirely self-sufficient. It was weak in engineering, and in 1908 Mr. C. W. Killam, now Professor of Construction, was called to add a course in the Resistance of Materials and Elementary Structural Design. From that time on, Professor Killam steadily built up and strengthened the structural teaching in the School.

A number of new men were called to teach, either on part or full time. In 1911 the burden of teaching Design became so great that Mr. J. S. Humphreys, now Professor of Design, was called from the firm of Carrère and Hastings, with whom he was employed in New York, to assist in the teaching of Architectural Design. The same year an important addition had been made by the calling of Professor E. J. A. Duquesne, a graduate of the Ecole des Beaux-Arts and winner of the Grand Prix de Rome, to teach Design. It was the beginning of a policy, now followed in the School, to offer instruction in architecture to American youths in an American university, but to import from Paris the essentials of the Beaux-Arts training and to have these taught by a brilliant graduate of the Beaux-Arts itself.

Architecture was made one of the departments of the Graduate School of Applied Science in 1906,[1] offering the degree of Master in Architecture to students who entered with the Bachelor's degree. The students who at that time were studying for the s.b. in Architecture were allowed to finish their work for the degree. The first degrees of Master in Architecture were awarded in 1907. In 1912 the Department was reorganized as a separate school under the Faculty of the Graduate Schools of Applied Science; but in 1914 the Faculty of Architecture was established, to include the teachers of Architecture and Landscape Architecture; and this Faculty was given entire control of the curricula and degrees for the two Schools.

The Great War interfered with the development of the Schools. Professor Duquesne had a great success, but was recalled to France in 1915 and was not able to return. The considerable enrolment which the School had in 1916 was obliterated upon America's entry into the war. In 1918 there were actually fewer students than teachers in the School. Mr. Arthur Brown, who had come from the firm of Bakewell and Brown in San Francisco to take charge of Design, found little to do, and returned to the practice of his profession.

The School received a great blow in 1917 through the death of Dean Warren. His had been the energy, enthusiasm, and driving force which, more than anything, created the School. He was not only a profound scholar of the history of art and a creative designer of ability, but a brilliant linguist and a broad-minded humanist as well. His name, more than any other, will always be associated with the School. Upon his death, Professor C. W. Killam was made Acting Dean. Immediately after the war students began to return to the School, and throughout the fruitful five years of Professor Killam's acting deanship the enrolment slowly increased.

In the spring of 1922 Jean-Jacques Haffner was called from France to take charge of the teaching of Advanced Design. Professor Haffner was a graduate of the Beaux-Arts in 1909, and winner of the Grand Prix de Rome in 1919. He had fought throughout the war in the French Army, and in the latter part of it had been *officier de liaison* with the American troops. He was therefore able to handle the English language with facility. His success with the students was immediate.

In 1922 George H. Edgell (a.b. 1909) was called from the Department of Fine Arts to the deanship of the Faculty of Archi-

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1. See Dean Hughes's chapter on Engineering, above, for the successive reorganizations of the Scientific School.

tecture. It had been found convenient for the running of the Schools to permit each to have a council of its own, composed of its teaching staff. Thus, much routine work could be covered when collaborative deliberation was unnecessary and the volume of business to be discussed by the Faculty much reduced. Warren and Killam had been successively chairmen of the Council of the School of Architecture. Edgell succeeded them in that position, and was also made Dean of the Faculty.

In 1922 certain changes in the staff and curriculum were made. C. Howard Walker (A.B. 1890), who had been teaching History of Architecture, regretfully resigned from the School. The same year, William G. Perry (A.B. 1905), who had been teaching Design, found the pressure of practice so great that he, too, resigned. Design was then put in complete charge of Professors Haffner and Humphreys. The History of Architecture was taught by the Dean and by George H. Chase of the Fine Arts Department, who took the classical course. Kenneth J. Conant (A.B. 1915), who had been teaching Elementary Architectural Design, took charge of the drawing in the history courses. The amount of History was reduced and Design stressed. Any graduate school must have a well-rounded curriculum and neglect no sub-division of its programme. On the whole, it is fair to say that during the régime of Dean Warren special emphasis was laid on Architectural History; during that of Acting Dean Killam, on Architectural Construction; and during that of Dean Edgell, on Architectural Design. The curriculum is now arranged to include all the History and Construction in the first two years, leaving at least one year in which the student devotes practically all of his time to Advanced Design.

The School is now entirely upon a graduate basis. The sole entrance requirement is the bachelor's degree. This may be in Arts, in Science, or in Architecture. There is no specified length of time required for the degree. A student who enters with the degree of Bachelor in Arts or in Science, having had no technical architecture, may be required to spend three and a half to four years in getting the master's degree. Design is the longest subject and, since promotion in Design is on a competitive basis, no exact time requirement can be imposed. If a student enters with the degree of Bachelor in Architecture from a good school — and many brilliant ones do so — he is placed in the most advanced course in each subject, and is granted the degree when he completes these and his thesis. A handful of the most brilliant students, so equipped, have got the degree in one year; but an increase in the requirements in Advanced Design makes it improbable now that even a student so equipped can receive the degree in less than a year and a half.

The courses now offered include: the History of Classical Architecture (Conant); the History of Mediaeval, Renaissance, and Modern Architecture (Edgell); Descriptive Geometry, Shades and Shadows, and Perspective (H. A. Frost); Elementary and Advanced courses in Freehand and Water Colour (Harold B. Warren); Elementary and Advanced courses in Life Drawing (Hermann D. Murphy and A. L. Ripley); Elementary Architectural Design (W. F. Bogner); Intermediate and Advanced Design (Haffner and Humphreys); Materials and Methods of Building Construction and two courses in the Theory of Building Construction (Killam); three courses in Modelling (John Wilson); Heating, Plumbing and Lighting (C. A. Whittemore); Contracts and Specifications (William S. Parker); and the Theory of Architecture (Haffner). During his course of study every student is required to take two historic problems, to make sure that he can handle the historic styles. He is also given two practical problems in Construction. At the conclusion of his course every student is required to write a programme for a thesis, which involves the making of a dozen drawings (plans, perspectives, and elevations) of some monumental building chosen by himself. He also has three problems in Construction with practical reference to the thesis.

The School admits a certain number of special students who are not holders of the bachelor's degree, provided they have had not less than three years' practice in an architect's office. These men take a course of approximately two years, and though they cannot receive the master's degree, are granted a Certificate of Accomplishment if they pass their course satisfactorily.

The School of Landscape Architecture, although closely related to that of Architecture, has had an independent development. The first course in Landscape Architecture, we have seen, was given in 1900–01 by Olmsted and Shurtleff, and a special programme was established the next year for students interested in the subject. In 1903 the Charles Eliot Professorship of Landscape Architecture was established from the Robinson endowment, and Olmsted became the first incumbent. The same year, James Sturgis Pray (A.B. 1895) was appointed Instructor in Landscape Architecture. Shurtleff retired in 1906, and Henry Vincent Hubbard (A.B. 1897) was appointed Instructor in his place. Until then Olmsted had been the moving spirit in the instruction. Pressure of business, however, required his partial relief from instruction, and the burden of administration fell upon Professor Pray.

In 1906 the instruction in the School of Landscape Architecture was placed upon a graduate basis, as in the School of Architecture; and the steps toward independence were taken simultaneously by the two Schools in 1914. Professor Pray in 1914 became Chairman of the School of Landscape Architecture, though by an oversight his actual appointment as such was not confirmed by the Corporation until 1925. Three years later impaired health, due to the strain of increasing duties, impelled him to resign the chairmanship to Bremer W. Pond.[1] Pray remained as Charles Eliot Professor, continuing his courses under a slightly revised schedule, until his death in February, 1929. To his devotion to the School, and his vision of the peculiar developments that landscape architecture could follow in America, the University owes much.

In the field of City Planning, the School of Landscape Architecture, first of its kind in the country, has rendered a great public service. This subject, so important for the future of America and the well-being of her citizens, was recognized by Harvard in 1909, when Pray and Hubbard gave the first courses on City Planning. Others were gradually added until, in 1923, the Faculty voted to offer a special programme for that subject, leading to the degree of Master in Landscape Architecture with Special Reference to City Planning. This is the first degree of that sort offered in the United States.

In the spring of 1929 James Freeman Curtis (A.B. 1899) gave to the University $150,000 to establish a chair of Regional Planning, in memory of his friend Charles Dyer Norton of New York. At the same time members of the profession of city planning had been considering the possibility of establishing a graduate school of that subject. At their invitation various American universities submitted plans, and the one drawn up by Professor Henry V. Hubbard was accepted. The Rockefeller Foundation then voted $250,000 to be expended by Harvard University for establishing the School.

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[1] Professor Pond (M.L.A. 1911), after practising his profession for three years, joined the Faculty as Instructor in 1914.

The Harvard School of City Planning, the first school of that subejct in America, will be co-equal with the Schools of Architecture and of Landscape Architecture. It will present a well-rounded programme in City Planning, in coöperation with its sister schools, and with the departments of the University which teach engineering, business administration, and the social sciences.

Stephen F. Hamblin was appointed Instructor in Horticulture in 1916. Kenneth J. Conant began giving his course in Architectural Design for landscape students in 1920; and in 1921 Harold B. Warren began offering his courses in Freehand. In 1928–29, the School has eight full-time officers of instruction, and the curriculum includes: The Principles of Landscape Architecture; Practice in Landscape Design (three courses); Practice in City Planning (three courses); Principles of Construction (three courses); several courses on Horticulture (Elements, Plant Materials, Planting Design); Landscape Topography; Freehand Drawing, Draughting, and Modelling. The School of Landscape Architecture has also made a special point of calling eminent practitioners, both of landscape architecture and of city planning, to give lectures and brief instruction — men such as Shurtleff, John Nolen (A.M. 1905), and Arthur C. Comey (A.B. 1907), as well as James Ford of the Social Ethics Department to teach the Housing Problem, and George E. Johnson of the School of Education to teach Community Recreation and similar subjects.

Both in Architecture and Landscape Architecture the aim has been to produce the best-trained practitioners. Occasionally the Schools produce a scholar in the history of his subject; but the tendency toward archaeology is deliberately avoided. At the same time, the curricula are kept as broad as possible, and an attempt is made to stress the principles of design, and to enable the student to specialize after he leaves the School. The requirement of a bachelor's degree is a severe one, and its advisability may be questioned; but the mature men which it brings to the School give the Faculty far more satisfactory material than could be obtained in any other way. The results are beginning to show; the Faculty believes that in another generation they will show brilliantly.

XXVIII. THE GRADUATE SCHOOL OF ARTS AND SCIENCES

1872–1929

By Charles H. Haskins, Litt.D.
Henry Charles Lea Professor of Mediaeval History, and former *Dean of the School*

THE Graduate School of Arts and Sciences has charge of students engaged in advanced study and research in the field of the arts and sciences. Already Bachelors of Arts or of Science,[1] these students are for the most part candidates for the degrees of Master of Arts and Doctor of Philosophy, while many are pursuing advanced studies independently of any degree. Although under the general direction of the Faculty of Arts and Sciences, they are free from the ordinary undergraduate discipline. At the beginning, in order to lay a foundation for strictly advanced study, many of them make up a part of their programme from courses of the middle group which they attend along with advanced undergraduates. Others are acquiring specialized knowledge and the technique of scholarship in courses 'primarily for graduates,' others are engaged in research of a very advanced and specialized sort, carried on for the most part under the individual direction of their instructors. As there is no general curriculum, so there is no uniform period of time for study in the School. Its highest degree, the doctorate of philosophy, is granted only for proved attainment and capacity for independent research, length of study being a wholly secondary matter, so that most students put in considerably more than the minimum period of study required.[2] It attracts picked men and sifts them rigorously.[3] Most professors in the

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[1] The 908 students registered in the Graduate School in 1928–29 represented 201 different colleges and universities of the United States and Canada, 3 of England, 8 of Continental Europe, and 9 of Asia.

[2] The minimum period of required *residence* for the Ph.D. is one year, but many candidates have to start teaching before their dissertation is fairly begun, and return later for their final examination. A study of the Ph.D.'s granted in the years 1912–14 reveals that 19 took the degree two or three years after their bachelor's degree, 58 in four to six years, 39 in seven to ten years, and 29 took it over ten years from their baccalaureate.

[3] For example, of the 108 Harvard A.B.'s *summa cum laude* 1895–1908, 61 entered the Graduate School, 21 entered all the other graduate departments of the University. — President's *Report* for 1907–08, p. 124.

Faculty of Arts and Sciences teach both graduate and undergraduate students, so that the Graduate School of Arts and Sciences is a body of students rather than a body of instructors, and derives its special character from the advancement and purpose of its students and the nature of their studies.

An account of the instruction in the School will be found distributed through the several chapters of this volume on the branches of learning administered by the Faculty of Arts and Sciences. It will here suffice to trace the evolution of 'resident graduates' into graduate *students*, as facilities developed for advanced instruction in the arts and sciences: one of the most significant developments in the entire history of the University.

Harvard College from the foundation encouraged its alumni to remain in residence after taking the bachelor's degree, and in 1825 the alumni of other colleges were invited; but no instruction was provided for such men, outside the schools of law, medicine, theology, and science, until the Graduate Department was founded in 1872.

As at Oxford and Cambridge, so at Harvard in the seventeenth century, Bachelors of Arts were expected, though not required, to remain in residence three years before proceeding to their second, or master's, degree. The only requirement for that degree, from the late eighteenth century to 1872, was to 'preserve a good character' during three years, appear at Commencement, perform a part if requested, and pay a small fee.[1] 'Resident graduates,' both bachelors and masters, were required to attend chapel as well as the public lectures of the several professors — a not very arduous duty when professors were few and lectures infrequent.

George Ticknor got into the new College Laws of 1825 the first provision for alumni of other colleges to become 'resident graduates,' who were no longer required, but permitted, to attend lectures and use the Library and scientific collections, in return for an annual fee of five dollars. In the catalogue for 1826–27 appear five 'resident graduates,' including 'Ralph W. Emerson, A.B.,' Edward Mellen from Brown, and Alexander Rives from Hampden-Sidney. Ticknor intended this provision to be an entering wedge for postgraduate instruction, but no such instruction was provided; and no degree was open to 'resident graduates' unless they were Harvard A.B.'s. Hence the annual enrolment of 'resident graduates' never rose above fifteen, and was usually much less. But the opportunity to continue a scholarly life in academic surroundings was appreciated by a limited number.[1]

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[1] 20*s*. (1734), 30*s*. (1790), $5 (1820); and a like sum for the Commencement Dinner.

President Eliot considered the germ of the Graduate School to be the University Lectures, which were first provided under President Hill, in 1863. These were courses of lectures on various subjects, mostly scientific, by Harvard professors and others. The public was admitted for a fee which was the sole remuneration of the lecturer, except for those who were maintained by the Museum of Comparative Zoölogy and the Medical School. Actually these lectures resembled university extension work more than anything now understood as graduate instruction. Something approaching the latter, however, was provided in the opening year of Eliot's administration: two University Courses of Instruction for 'graduates, teachers, and other competent persons (men and women).' The Philosophy course was conducted by Emerson, Bowen, John Fiske, C. S. Peirce, F. H. Hedge, J. Elliot Cabot, and George Park Fisher; the Modern Literature course by Bôcher, Lowell, Child, Whitney, Cutler, and William Dean Howells. A fee of $150 was charged for each course, reading was required, examinations were held, and honors were granted. Four Harvard graduates, including Francis G. Peabody (A.B. 1869), took the examination in the Philosophy course; the enrolment in the other was six women and three men. With so little demand the experiment was not repeated. Thirty-five courses of the regular University Lectures were offered in 1870–71, for fees ranging from three dollars and a half to ten dollars. Again, the demand was slight; and President Eliot had to confess that the scheme had 'failed hopelessly.' But the University Lectures had, at least, 'demonstrated that for its real, steady development the University must place its reliance upon resident, paid, professional teachers.'[2]

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[1] Including Professors Norton, Gurney, Goodwin, and Sophocles; Simon Newcomb (S.B. 1858), James K. Hosmer (A.B. 1855), Charles Sanders Peirce (A.B. 1859), and William Lawrence and Charles J. Bonaparte (A.B. 1871). 'Resident Graduates not candidates for a degree' last appear in the catalogue for 1885–86.

[2] *Reports* of President Eliot for 1869–70, pp. 19–20; 1871–72, p. 13; annual catalogues; Francis G. Peabody, 'The Germ of the Graduate School,' *Harvard Graduates'*

University Lectures, accordingly, disappear from the catalogue after 1871–72. In their place a Graduate Department was created (January, 1872) by action of the governing boards, which at the same time reformed the A.M. and established higher degrees. The Academic Council, consisting of all the professors of all faculties, was created to administer and recommend candidates for the degrees of Master of Arts, Master of Science, Doctor of Philosophy, and Doctor of Science. At Commencement, 1872, the master's degree was for the last time conferred 'in course' on Bachelors three years out of college, upon payment of five dollars. Thenceforth it has been granted only to graduates of Harvard or other accepted colleges, after at least a year's residence spent in an approved 'course of liberal study,' followed by suitable examination. In 1887 this requirement was defined as passing four courses of the 'middle group' with a grade of A or B. Subsequent regulations stress the advanced nature of the study. The candidate's programme must be a 'consistent plan of work pursued with some definite aim,' approved by the Administrative Board, and, ordinarily, by a division of the Faculty.[1]

When the Graduate Department was founded, there was no distinction between undergraduate and graduate studies; and no hard-and-fast line has ever been drawn between them. Graduate students simply took elective studies that they had been unable to take in college. From the first, however, a few advanced courses were provided, and in 1875–76 courses 'primarily for graduates' make their first appearance in the catalogue.

A very significant departure was made in 1877–78. 'Besides the regular courses of instruction,' states the catalogue, 'graduates may often make arrangements to obtain advice or direction, and in some cases special instruction, in the pursuit of higher studies, from professors or other competent persons.' That is the sort of study for which a graduate school properly exists, and which marks it off from most other departments of the University. The 'special instruction' by professors began to

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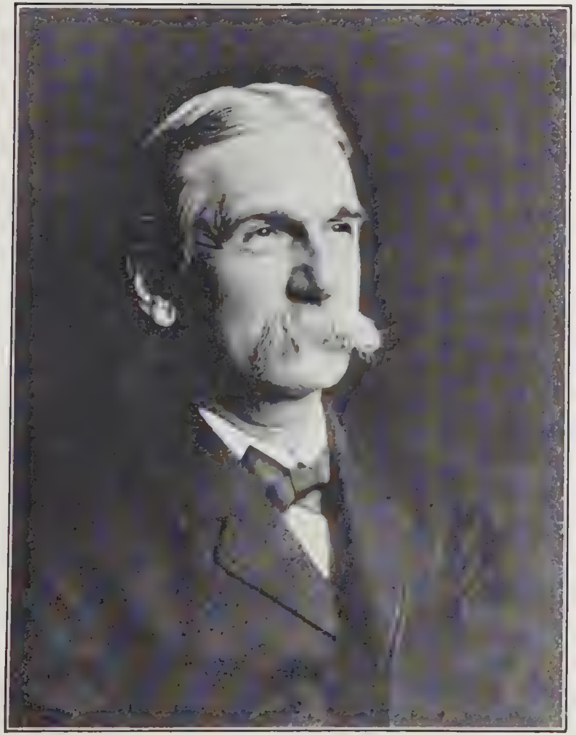
Magazine, xxvii (1918), 176–181; and his notebook, now in the Harvard University archives. Among the lecturers of 1870–71 were Shaler, Pumpelly, J. K. Paine, William Everett, Lowell, Torrey, Goodwin, Lane, C. C. Perkins, Benjamin Peirce, James M. Peirce, Emerson, who gave his course on the Natural History of the Intellect, and Fiske, who gave the substance of his *Outlines of Cosmic Philosophy*.

[1] The Administrative Board of the Graduate School is in 1929 recommending a raising of requirements for the A.B., and a closer supervision of candidates. Yet of 1748 candidates for the degree, 1923–28, 40 per cent failed to earn it in one year.

JAMES MILLS PEIRCE



CHARLES LORING JACKSON

FRANK WILLIAM TAUSSIG

appear in the catalogues after 1885 as so-called '20' courses, but this personal instruction has never become systematized or formalized, and has always left the way open for individual direction of research.

Professors C. L. Jackson, Farlow, Child, and Goodwin were among the members of the Faculty most interested in promoting graduate studies; but to no one, excepting always President Eliot, is the Graduate School so indebted as to James Mills Peirce, who, as Secretary of the Academic Council from 1872 to 1890, and Dean of the School to 1895, devoted himself to the promotion of graduate instruction with the greatest energy and ability.[1]

From the administrative reorganization of 1890, the Graduate Department emerged as the Graduate School of Harvard University, under the new Faculty of Arts and Sciences, but with administrative officers of its own. The name was changed to Graduate School of Arts and Sciences in 1905, in order to distinguish it more clearly from the professional schools which had assumed a graduate character.

The growth of the School can be followed by the aid of this statistical table:

Students and Degrees for every Fifth Year
1872–73 to 1927–28

		Degrees	
Year	Students	Doctors'	Masters'
1872–73	28	3	0
1877–78	67	7	13
1882–83	56	5	12
1887–88	97	7	32
1892–93	216	13	70
1897–98	293	26	116
1902–03	325	29	130
1907–08	424	43	125
1912–13	504	48	122
1917–18	321	45	64
1922–23	689	58	152
1927–28	946	70	262

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[1] W. W. Goodwin, 'The Growth of the Graduate School,' *Harv. Grad. Mag.*, ix (1900), 178; see also Dean Peirce's last report, in the President's *Report* for 1894–95, pp. 101–133.

WHOLE NUMBER OF HIGHER DEGREES, 1873–1928

Ph.D.	1596
S.D.	30
A.M.	5252
S.M.	60
	6938

The quality of the early doctors in arts and sciences (1873–78) is shown by such names as John Trowbridge, William K. Brooks, William Everett, N. S. Shaler, Henry Cabot Lodge, J. Walter Fewkes, Frank A. Gooch, John Williams White, Charles Sedgwick Minot, and the university presidents Edward A. Birge and G. Stanley Hall.[1] Still, in these early years the Graduate School counted for little in the general life of the University, and in the country as a whole it was not till the decade of the eighteen-nineties that the Harvard Graduate School began to exert an influence comparable to that of the Johns Hopkins University, which from its foundation in 1876 placed its chief emphasis upon graduate instruction in the arts and sciences.

The administration of the School has never been elaborately developed or closely centralized. It has no budget except for office expenses, owns no building, and has no endowment. Its officers have been a Dean, serving as Chairman of an Administrative Board of ten or twelve, chosen from the professors most closely connected with graduate study, and a Secretary, or Assistant Dean, who has had charge of the routine work of the office. The Dean has also been a professor; indeed, instruction has claimed the greater part of his time, though with the growth of the School he has inevitably had to give more time to consultation with individual students. The primary direction of the students' work has continued to lie in the hands of the several professors and divisions of the Faculty, rather than in the Dean's office.

Professor Peirce was succeeded as Dean by John Henry Wright, Professor of Greek, who served from 1895 until his death, November 25, 1908. 'In his relations with the students he was a wise and friendly counsellor, catholic and unprejudiced, helpful, appreciative, and inexhaustibly patient. His advice was alike valued by them, whether it concerned the direction of their studies or the conduct of their lives.' [1]

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[1] For the succeeding period, cf. the statistics on PH.D.'s, fellows, and other students listed in *Who's Who in America*, in the President's *Report* for 1921–22, pp. 70–71.

The succeeding Deans have been Professors C. H. Haskins (1908–24), J. L. Lowes (1924–25), and G. H. Chase (1925–). George W. Robinson (A.B. 1895) served as Assistant to the Dean from 1898 to 1904 and as Secretary of the School from 1904 to 1928, the longest term of service of any officer of the Graduate School. Lawrence Shaw Mayo (A.B. 1910) was appointed Assistant Dean in 1927.

The distribution of Doctors of Philosophy among the several subjects, their theses, and their subsequent careers, can best be seen from the catalogue of Doctors of Philosophy and Doctors of Science of Harvard University (1926). In the table on page 458 these figures have been brought down to 1928.

Such statistics fail to exhibit the changes in the resort to particular departments, or to indicate such recent developments as the expansion of instruction in the Fine Arts and at the Museum of Comparative Zoölogy, and the encouragement of advanced study for the doctor's degree at the Harvard Observatory. They fail also to bring out the great influence exercised by the Graduate School through its Masters of Arts and others who have gone far with their advanced studies without proceeding to the doctorate. In the nature of the case, these statistics cannot be compared with those of the various professional schools having fixed curricula.

The printed list also shows that most of the Doctors of Philosophy have become teachers, as we might expect; in fact, one hundred members of the Faculty of Arts and Sciences at Harvard in 1929 are Harvard PH.D.'s. As Dean Chase points out, on the basis of the printed list of 1926:

> More than three quarters of those whose names are here listed are or have been teachers, almost all of them in universities or colleges. Next in number come men engaged in research apart from teaching, but it is noteworthy that the list includes eighteen clergymen, fifteen presidents of universities or colleges, fourteen men engaged in editorial work, seven librarians, six physicians, four men in diplomatic or con-

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[1] Report of Acting Dean H. W. Smyth, in President Eliot's *Report* for 1908–09, p. 123.

sular service, two members of Congress, two United States Senators, and a Prime Minister of Canada. There are also several high officials of important business organizations.[1]

Doctors of Philosophy and Science according to Subjects
1873–1928

Ancient Languages		119
Indic Philology	7	
Classical Philology and Archaeology	109	
Biblical and Patristic Greek	3	
Anthropology and American Archaeology		25
Biology		174
Botany	67	
General Physiology	6	
Zoölogy	101	
Chemistry		173
Education		24[1]
Fine Arts		6
Geology		61
History, Government and Economics		306
History and Government	188	
Economics	118	
Mathematics		65
Medical Sciences		38
Modern Languages and Literatures		352
English	223	
Germanic Languages and Literatures	39	
Romance Languages and Literatures	79	
Comparative Literature	11	
Music		4
Philosophy		202
Physics		61
Semitic Languages and History		16
Total		1626

[1] Since 1920, candidates for a doctor's degree in Education have ordinarily taken the degree of Doctor of Education in the Graduate School of Education.

Significant, also, is the emphasis which this printed list places upon research. Most of the doctoral dissertations have been published in whole or in part, and in many cases the investigation begun in the Graduate School has developed into an important part of the doctor's life work as a scholar and trainer of scholars. A beautiful illustration of such an expanding influence is seen in the thesis of the late Theodore William Richards on Atomic Weights (1888), the starting-point of a career of research which was crowned by the Nobel Prize in Chemistry, and was reflected in the numerous theses of his students for the next forty years. Here, again, any mere catalogue of theses is far from being a complete index of the stimulus of research given by the Graduate School. Thus, the titles of three theses of 1876, those of James Lawrence Laughlin, Henry Cabot Lodge, and Ernest Young, show that they were all part of a volume of Essays in Anglo-Saxon Law, but say nothing of the work of their master and inspirer, Henry Adams, or of the fact that this pioneer volume is a landmark in the study of history by the seminary method in the United States. A distinguished professor of history at Yale calls this 'the earliest true seminary work done in this country.'[1]

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[1] *Reports of the President and the Treasurer of Harvard College*, 1925–26, p. 114.

Many of these theses have been published in the departmental series, such as the Harvard Studies in Classical Philology, Harvard Historical Studies, Harvard Economic Studies, Harvard Studies in English, Harvard Studies in Romance Languages, Harvard Studies in Comparative Literature, Studies and Notes in Philology and Literature, Harvard Psychological Studies, Publications of the Gray Herbarium, and Contributions from the Zoölogical Laboratory. Others have been printed as independent volumes through the Harvard University Press, whose facilities for publication have been a decided stimulus to the productive work of advanced students. Beginning with 1925, the Press has undertaken to publish annually Summaries of Theses, each Doctor of the year having 500 to 2500 words to summarize his dissertation.

Since its earliest days the work of the Graduate School has been greatly furthered by the system of travelling fellowships.[2] Some of these are specifically assigned to the Graduate School of Arts and Sciences or its several departments, while others, like the grants from the Frederick Sheldon Fund, are open to general university competition. For the most part they are reserved for students who have already received the degree of Doctor of Philosophy, or have advanced far in their special work toward that degree. The purpose of such appointments has been, in part, to promote the education of the holder by travel and sojourn in other countries and at other universities; but they have also served in very large measure the cause of research by giving students access to foreign libraries, archives, and museums, and opportunities for field work in archaeology and the descriptive sciences, and for the study at first hand of economic and political problems. Such opportunities have covered the whole of Europe and have extended to other continents as well.[1]

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[1] George Burton Adams, 'Methods of Work in Historical Seminaries,' in *American Historical Review*, x (1905), 521; see also Chapter VII, above.

[2] A list of the Fellows of 1888–89, with their positions twenty-five years later, given as a sample, may be seen in the President's *Report* for 1912–13, pp. 97–98.

At home the work of graduate students has stood in closest relations to the Harvard University Library, by reason both of the extraordinary richness and volume of its collections and of the liberal facilities of access and use. Much is due to the liberal policy of Justin Winsor and his large conception of the place of a library in university life, still more to the wisdom, initiative, and personal devotion of Archibald Cary Coolidge, under whose directorship (1910–28) the University Library nearly doubled in size and acquired the Widener building, with its seminary rooms and its exceptional facilities for the work of advanced students in the stacks.[2] In all these matters, Professor Coolidge was most keenly alive to the needs and interests of the Graduate School.

On its scientific side, the work of the Graduate School has been, of course, closely dependent on the laboratories and the museums in the several subjects, in ways that are too obvious to require explanation.

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[1] Besides a host of studies in English literature and history, the geographical distribution of investigations furthered by travelling fellowships and similar appointments may be illustrated by printed monographs such as the following: W. B. Munro (PH.D. 1900), *The Seigniorial System in Canada;* J. H. Williams (PH.D. 1919), *Argentine International Trade;* A. M. Tozzer (PH.D. 1904), *A Comparative Study of the Mayas and the Lacandones;* R. H. Lord (PH.D. 1910), *The Second Partition of Poland;* H. G. Leach (PH.D. 1908), *Angevin Britain and Scandinavia;* O. J. Campbell (PH.D. 1910), *The Comedies of Holberg;* R. L. Hawkins (PH.D. 1908), *The Life and Works of Maistre Charles Fontaine, Parisien;* A. P. Usher (PH.D. 1910), *The History of the Grain Trade in France, 1400–1710;* C. R. Post (PH.D. 1909), *Mediaeval Spanish Allegory;* Julius Klein (PH.D. 1915), *The Mesta;* K. J. Conant (PH.D. 1925), *The Early Architectural History of the Cathedral of Santiago de Compostela;* D. P. Lockwood (PH.D. 1907) *The Life and Works of Rinuccio Aretino;* besides more technical scientific studies in Oceania, Africa, and the Far East.

[2] See chapter XXXVIII, on the College Library, in this volume.

Taken as a whole, the Graduate School of Arts and Sciences has had little organized social life. At the beginning of each year the authorities of the School have held a reception for new graduate students, after which these have gone their several ways. In the early years of the School, a Graduate Club was organized; but with the growth in enrolment and specialization, this has disintegrated. There has been a corresponding growth of departmental clubs and conferences of students and professors, such as the Modern Language Conference, Classical Club, History Club, Mathematical Club, Physical Colloquium, Biological Seminar, and so forth. Nor has the School ever had a fully developed local habitation, still less a graduate college. In 1906 Conant Hall, with a Common Room but without dining facilities, was set apart for graduate students, and to this in 1921 was added a portion of the neighboring Perkins Hall. The two buildings accommodate between them about two hundred students out of nearly a thousand registered in the School. Such facilities have been of great advantage in furnishing convenient quarters and the possibilities of a richer social life, but have not been further extended or intensified. For the large number of married graduate students, something has quite recently been done in the erection of apartment and duplex houses for their special occupancy at Shaler Lane and Holden Green.

Many of these graduates, married or unmarried, also hold positions as instructors, tutors, or assistants in the University. This has been true to a certain extent since the earliest days of the School, but the number thus employed has increased rapidly in recent years, as at other universities, but at Harvard especially with the growth of the tutorial system. This fact has tended to prolong the period of graduate study, and at the same time to soften the transition from student to teacher. In the personnel of its student body as well as in the nature of its studies the Graduate School of Arts and Sciences shades almost imperceptibly into the Faculty.

When the establishment of a Graduate Department was first before the College Faculty, in 1872, there was much opposition. It was said that the University had insufficient funds to teach undergraduates properly, and that a graduate department would weaken the College. To which President Eliot replied, as Professor Palmer remembers, 'It will strengthen the College.

As long as the main duty of the faculty is to teach boys, professors need never pursue their subjects beyond a certain point. With graduate students to teach, they will regard their subjects as infinite, and will keep up that constant investigation which is necessary for the best teaching.'

No prophecy of Eliot has been more amply fulfilled.

XXIX. THE THEOLOGICAL SCHOOL

1869–1928

By William Wallace Fenn, D.D.
Bussey Professor of Theology and former *Dean of the School*

WHEN President Eliot took office in May, 1869, the Harvard Divinity School, as it was then called, was in a bad way. The University authorities, having failed to get rid of it by legal separation, seemed disposed to let it wither by neglect. The catalogue of 1868–69 shows a registration of nineteen students under a Faculty of three. Only one of these, Professor Stearns, was giving his full time to the School; Professors Hedge and Clarke were also pastors of large and important churches in Brookline and Boston respectively. Standards, too, were low: the entrance requirements of the School were about equivalent to those of the College. Almost immediately, even this slender requirement was still further reduced.

For two years there had been running in Boston, under the energetic promotion of the Rev. George H. Hepworth, a School for the Ministry, the purpose of which was to receive young men of very meagre preparation, provide for them lectures in theology by neighboring Unitarian clergymen, and then send them forth as Unitarian ministers, or evangelists. The friends of this Boston school soon found it too burdensome, and at its Commencement in 1869 announcement was made that it would be discontinued and its students would be received in the autumn by the Harvard Divinity School. In order to effect this merger, the Harvard School was obliged to admit to a 'partial course' students presenting 'satisfactory evidence of character and promise,' while of those entering the 'full course,' leading to graduation, it was required only that they 'must possess a knowledge of the branches of education commonly taught in the best academies and high schools.' By this means, the number of divinity students of Harvard was doubled in one year; but the numerical gain was bought at too high a price. In the very next year, 1870–71, the standard was raised and candidates for admission to the 'full course' were required, in addition to 'a good English education,' to 'pass an examination in some of the Latin Classical authors, and in the Greek Text of the Gospels.' After this prompt recovery from a temporary lapse, entrance requirements were progressively raised, until the School took its proper place as a Graduate School of the University.

Believing firmly that a theological school has a rightful, and, indeed, necessary place in a university, President Eliot aimed to lift the Divinity School to honorable standing at Harvard. This called for an enlargement of the Faculty, and that required more endowment. With the break-up of the Boston School for the Ministry, Edward J. Young, its Professor of the Old Testament, came to Harvard. Charles Carroll Everett was called from his Unitarian parish in Bangor, Maine, and in 1869 began his thirty-one years of distinguished service in the School. In 1872, Ezra Abbot, already a New Testament scholar of mark, joined the Faculty, on which he served with ever-growing academic renown until his death in 1884. Since these new members of the Faculty were specialists in the fields of Old Testament, Theology, and New Testament respectively, a closer organization of the Faculty and the curriculum was called for. On April 25, 1870, Professor Stearns was made Dean of the Faculty. In the catalogue for 1873–74, professors are designated for the first time to particular chairs and departments, although it was not until the catalogue of 1881–82 that definite and specific courses of instruction were announced.

An enlarging Faculty called for increased endowments. In 1879 a public appeal was made, which added $138,000 to the funds of the School. In the course of this undertaking, President Eliot made a significant declaration, the purpose and result of which was to place the School more solidly and unequivocally upon the level of a University School of Theology.

In 1816, when the Society for Improving the Means of Theological Education in Cambridge was formed, a statement was adopted prescribing that 'every encouragement be given to the serious, impartial, and unbiassed investigation of Christian truth: and that no assent to the peculiarities of any denomination of Christians be required either of the Students or Professors or Instructors.' This was undoubtedly intended as a protest against the determination of the founders of the Andover Theological Seminary to bind their institution irrevocably to a single and exceedingly provincial type of Christian doctrine. In consequence, the Harvard School had been theoretically non-sectarian from the very beginning of its distinct existence, although in fact, probably none but Unitarians would have been offered teaching positions or could have been induced to accept them; and nearly all the students were preparing for the Unitarian ministry. With characteristic frankness and courage, at the very time when President Eliot was seeking money for the School from Unitarians, he declared publicly that it was to be a University, not a Unitarian, School of Theology; that denominational distinctions were to be disregarded in the administration of its affairs, and particularly in the choice of professors. It was upon this explicit understanding that, to their credit, Unitarians responded with generous contributions, evidently content that their clergy should be educated in such a school as President Eliot proposed.

Appointments were made in harmony with the declared policy. Professors Toy and Lyon, appointed in 1880 and 1882 respectively, were both Baptists. Dr. J. Henry Thayer, a Trinitarian Congregationalist, and formerly a professor in Andover, succeeded Ezra Abbot, in 1884. During the past fifty years, sixteen appointments of professor's rank have been made in the School; five Unitarians, six Trinitarian Congregationalists, two Baptists, one Anglican, one Roman Catholic, and one Jew. So consistently has President Eliot's policy been pursued that of the sixteen members of the teaching force in 1928–29, only two are Unitarians. It is impossible to give statistics of this sort about the students, since their religious affiliations are not inquired into or officially known; but it is safe to say that their denominational distribution is even more diverse than that of the teachers.

This characteristic of the School was manifest also in the summer sessions which it conducted from 1899 to 1910, and again in 1920 and 1921. These Summer Schools of Theology offered three lectures a day for fifteen days, given in short courses by lecturers of various denominations, and were attended by students, usually clergymen in active service, coming from all denominations and all parts of the country. No examinations were held, and no credit was given toward a Harvard degree; yet the attendance was surprisingly large, although not sufficient to defray expenses. Considerations of economy caused the summer sessions to be abandoned, although they were widely useful and contributed to a better understanding of the School.

Growing recognition of the non-sectarian character of the School has brought into affiliation with it several denominational theological schools in and about Boston. In 1908, after a century of honorable and fruitful life on Andover Hill, the Andover Theological Seminary entered into articles of affiliation with Harvard University, and removed to Cambridge. The articles provided for a combination of the resources of the two theological schools in a large, rich, and harmonious offering of theological instruction. To the same end, the libraries of the two institutions were united, and housed in the new Andover building. In consequence, the Divinity Library building, erected in 1887, was made over to the Farlow Library and Herbarium. Following the Andover precedent, other theological schools in the neighborhood — the Episcopal Theological School, in 1914, the Boston University School of Theology (Methodist), and the Newton Theological Institution (Baptist), in 1915 — also entered into affiliation with Harvard upon varying terms of intimacy, in every case providing for an interchange of instruction. In effect, all these affiliations, except that with Andover, have been rather one-sided in their operation, since few Harvard students have taken advantage of them, compared with those from the other schools who have received Harvard instruction.

The affiliation with Andover had worked so well that to friends of both schools a closer relation seemed desirable. Accordingly, in 1922 the Harvard Divinity School and Andover Theological Seminary were united to form the Theological School in Harvard University, of which Dr. Willard Learoyd Sperry was appointed Dean. This union was unmistakably in the interest of economy and efficiency, besides being a fine, and in view of the history of the two schools an exceptionally significant, object lesson in Christian fellowship. It was especially favorable to Andover, which retained absolute control of its own properties. Nevertheless the Andover Board of Visitors objected, and their objection was sustained by the Supreme Judicial Court of Massachusetts, which in 1925 dissolved the union. Thereupon the Andover Board of Trustees terminated the affiliation also, and the Seminary has ceased to function.

It was probably on account of the non-sectarian character of the School that the Trustee of the Lowell Institute invited its Faculty, in 1906, to arrange for a series of Lowell Institute Lectures on religious subjects, to be given in King's Chapel on Monday afternoons. The invitation has been renewed year by year, and the courses have been planned by a Harvard Committee which has included also, since the affiliations, the Deans of Andover Theological Seminary and the Episcopal Theological School.

In January, 1908, appeared the first number of the Harvard Theological Review, issued quarterly by the Faculty of Divinity in Harvard University. This Review was partially endowed by a bequest of Miss Mildred Everett 'for the establishment and maintenance of an undenominational theological review,' in order to carry out a plan suggested by her father, the Rev. Charles Carroll Everett, who had been Dean of the School from 1878 until his death in 1900. In its conduct of the Review, the Faculty, through the Editorial Committee, has aimed to make it a worthy memorial of Dean Everett's 'comprehensive thought and catholic spirit,' and truly representative of the nonsectarian character of the School.

President Eliot's strong belief in the elective system in college education naturally led to its introduction into the Divinity School. Besides, the changing conditions of a minister's life and work required enlargement and readjustment of the curriculum. In earlier days, the prime duty of a Protestant clergyman was to set forth the system of revealed truth contained in the Sacred Scriptures. To this end he was drilled in the original languages, Hebrew and Greek, as the major part of his theological education. When the Bible dropped out of this central place, the languages were given correspondingly less attention. Hebrew ceased to be obligatory, and after a while Greek was no longer required. On the other hand, with the disappearance of the theory of a closed system of revelation, the lines of demarcation between theological and allied disciplines tended to vanish also. Other religions were sympathetically studied. The successive stages of the old-time 'process of revelation' were correlated with their contemporary culture levels. The phenomena of religious experience were studied psychologically. Science, history, and philosophy made their way into the curricula of theological schools. Furthermore, the minister naturally entered into the new social interests and activities, becoming prominent in reform movements and remedial activities. In such ways as these, theological education has been undergoing marked changes during the past fifty years, and in this movement the Harvard Divinity School has shared, and at certain points has led.

In some cases important changes occurred without deliberate determination by the Faculty, and as the result of other changes the effects of which were not foreseen. Take Hebrew, for instance. At the beginning of our period every candidate for a certificate of graduation, or for the degree of B.D., took, as a matter of course, all the instruction offered in the School; there were no electives. After courses were specified and designated by numbers, the requirement for a degree was changed from 30 hours of classwork, distributed through three years, to fourteen courses similarly distributed. More than fourteen courses were offered, thus making election possible. Soon it was discovered that under this plan, students could fulfill the requirement for a degree by a selection of fourteen courses which did not include the Hebrew language. So far as appears, the Faculty never passed a vote making Hebrew optional for the degree; it silently recognized a *fait accompli*. Not quite silently, however, for at a meeting of the Faculty in February, 1887, Professor Thayer put on record a 'permanent protest' against the granting of the B.D. degree to persons ignorant of the original languages of the Bible; but the protest did not check the practice. With reference to Greek, the change came about in a somewhat similar way. In 1882, a change was made in the conditions of admission by which only 'graduates of some college, or persons who give evidence of an education equal to that of a college graduate,' could be registered as candidates for the degree. Since Greek was then included in practically every college course leading to the A.B. degree, this condition ensured that every candidate for the Harvard divinity degree had some knowledge of the language of the New Testament. As time went on, however, colleges ceased to require Greek for the A.B. degree, or introduced other degrees, like Ph.B. or S.B., which differed from the A.B. chiefly by not covering knowledge of Greek. Thus, by accepting candidates whose A.B. was granted without Greek, and in other cases by equating the Ph.B. or the S.B. with the A.B., the Divinity School enrolled students ignorant of Greek, who were able at the end of three years residence to present the fourteen courses required for the degree with no knowledge whatever of the original language of the New Testament. Latin is taking the same course as Greek, and it is now possible for a student to win the Harvard S.T.B. who knows nothing of Latin, Greek, or Hebrew. This is an extraordinary change to have come about within fifty years, and there is no reason to believe that it was intended or foreseen by the Faculty when it made the degree dependent upon passing a specified number of courses, and enlarged the curriculum of the School.

It had, indeed, been provided that in a student's choice of fourteen courses no Department should be wholly neglected, but it often happened that only a single course, perhaps even a half-course, was elected in a particular Department. In consequence, students obtained the degree without receiving a well-rounded theological education. Accordingly, in 1912 the Faculty introduced a new system which did away entirely with the former plan of counting courses. Substantially, the new requirement was that, after three years of residence spent in theological study, the student must pass an examination, both oral and written, conducted by the Faculty as a whole, upon the entire field of theological learning.

As part of this new plan the Faculty has recently instituted a tutorial system by which students in the middle year are assigned to members of the Faculty who act as their advisers or tutors. This represents a feeling on the part of the Faculty that the lecture system alone does not produce satisfactory educational results, and that the English system must supplement and perhaps ultimately supplant the German.

For several years, under what Dean Everett used to call a 'pact' with the Graduate School, students enrolled in the Divinity School were allowed to stand for the degrees of A.M. and PH.D. under the general rules prescribed by the Graduate School. It was, however, palpably anomalous that students registered in one department of the University should receive degrees conferred by another. Consequently, on recommendation by the Faculty, the Corporation instituted in 1912 the degree of S.T.M., and in 1914 that of TH.D., administered solely by the Divinity Faculty. These higher degrees have proved attractive to students; and it is pleasant to note, as evidence of the better understanding of the School in academic circles, that candidates for teaching positions in colleges or theological schools are not handicapped by the fact that their degree was conferred by Harvard.

Ordinarily, theological schools in this country have endowments providing for their students sufficient aid to defray the cost of instruction, and in some cases of board and lodging also. In many schools, no charge is made for tuition, or, tuition is remitted in practically every case. Here, all charges by the University for tuition and room rent are actually paid by the student, and aid is given in the form of scholarships which are dependent upon satisfactory grades. Since the amount available for such scholarships is limited, the Divinity School was at a disadvantage as compared with other schools of a similar character, and could expect, in the circumstances, only a correspondingly limited number of students. Accordingly, Dean Sperry devised and carried into effect a plan of 'compensated church work,' by which students, particularly in their first year, are provided with work in neighboring churches which are willing to pay for their services. Thus the drain upon scholarship funds is diminished, and, also, students are given practical experience in the work for which they are preparing themselves. This plan has commended itself to students who are looking forward to the active ministry, and has somewhat arrested the tendency for the School to become a graduate school of theology preparing men for teaching positions instead of for the immediate service of the churches, although candidates for the higher degrees still bear a gratifying proportion to the whole enrolment.

The enlargement of the curriculum came gradually. The History of Religions as taught by Dean Everett was an integral part of his work in systematic theology. Holding that religion had to do with the three ideas of the reason, he taught that these were represented severally in certain historical religions, — Truth in the religions of India, Goodness in Zoroastrianism, Beauty in the religion of Greece, — while Christianity was shown to be a universal and final religion because combining all three ideas fully and in harmonious proportion. Thus, from his point of view, the History of Religions was a department of Systematics, whereas under Professor George Foot Moore it became a distinct and independent discipline, much appreciated and widely taken. The Department of Social Ethics grew up in a somewhat similar way. In 1881, Professor Peabody offered a course upon Practical Ethics, dealing with a minister's relation to social, economic, and philanthropic movements, which was soon opened to college students, and then announced formally as a course under the Faculty of Arts and Sciences, although remaining primarily a Divinity School course. The scion transplanted from the Divinity School to the College has there developed into the large and flourishing department of Social Ethics.[1] It should be noted in passing that the resort of college students to Professor Peabody's Divinity School course was the forerunner of an interchange of instruction between the College and the School which has now become so extensive that nearly every course offered in the Divinity School is announced also by the Faculty of Arts and Sciences and freely taken by college students. This again indicates the non-sectarian character of the School. Students in the College and Graduate School sit side by side with Divinity School students in the classroom, under instruction different neither in method nor in point of view from that to which they are accustomed in their department of primary registration.

Within the past fifty years the School has grown from a Unitarian school for the ministry, unworthy alike of the University and of the denomination it served, into a University school of theology unqualifiedly devoted to University methods and standards.

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[1] See Professor Ford's chapter on Social Ethics, above.

XXX. THE LAW SCHOOL

1817–1929

By Roscoe Pound, LL.D.
Carter Professor of General Jurisprudence and *Dean of the Faculty of Law*

1. Periods and Principles in the History of the School, 1817–1929

With an unbroken continuity of operation as a teaching school since 1817, the Harvard Law School is the oldest of the existing law schools in the United States. Before the Revolution a certain number of those who were preparing for the practice of law in America went to the Inns of Court. But mostly law students had a course of reading laid out for them by a friend or a preceptor, or underwent an apprenticeship in the office of a practitioner. Law schools grew up after the Revolution. The bulk of the profession was for a long time apprentice-trained, and it was not until the present century that the majority of those who came to the bar were school-trained. The stages in the development of the Law School mark periods in American legal education, and correspond to well-marked periods in the history of American law.

American law schools have a twofold origin: professorships founded in the latter part of the eighteenth century in imitation of Blackstone's chair at Oxford; and law offices in which the preceptorial function developed at the expense of law practice. The Harvard Law School, as we shall see, derived from both. First as a point of origin is the Royall Professorship, provided for by the will of Isaac Royall (d. 1781), but not established till 1815. Royall's will was executed in 1778, and to that extent he was a pioneer. But before his gift became available a number of professorships on the model of Blackstone's chair had been set up. None survived the eighteenth century. The Royall Professorship, on the other hand, within two years became merged in the Harvard Law School, and has had a continuous existence from its foundation.

In his inaugural lecture as Royall Professor, Chief Justice Parker of Massachusetts expressed the hope that at some time in the future 'a school for the instruction of resident graduates in jurisprudence' might be added to the professorship. For his was not a teaching chair. Like Wythe at William and Mary (1779–80), James Wilson at the College of Philadelphia (1790), and Kent at Columbia (1793), he lectured to such college Seniors, resident graduates, and occasional lookers-in from the local bar, as chose to hear him. A year later (May 17, 1817) Parker laid before the Corporation a plan for a law school. It was adopted by a vote appointing Asahel Stearns (A.B. 1797) 'University Professor of Law,' who was to live in Cambridge and 'open and keep a school.' He was to prescribe a course of study, confer with the students and examine them, read appropriate lectures, and act as a tutor. For this chair the school of Tapping Reeve at Litchfield, Connecticut, was the model as clearly as the Vinerian Professorship at Oxford was the model for Parker's chair.

Judge Reeve's school at Litchfield began about 1784. The exact date is uncertain because there was a gradual transition from law office to law school. To the end it was an expanded law office. The students copied precedents of pleadings and of conveyances, and read such books as were at hand, exactly as did apprentices in lawyers' offices. The chief difference, aside from the greater number of students, was that, instead of occasional conferences between preceptor and student, the teachers dictated lectures which, before the days of many printed textbooks, were in effect textbooks of the law. The school which Asahel Stearns set up at Harvard in 1817 was of this sort. Yet in its possibilities it was much more. There had been professorships of law in colleges without law teaching, and teaching of law in schools which in spirit and method were but law offices. Uniting the two ideas, combining the English idea of apprentice training with the continental idea of academic law teaching, as suggested by the Vinerian chair at Oxford, the Harvard Law School was the first university school of law in any common-law land. To the Litchfield sort of school it added a moot court, after the manner of the Inns of Court, and lectures by a university professor. Its possibilities were in the direction of an academic professional school, as contrasted with the purely academic law schools of Continental Europe, and the purely professional legal education which prevailed in England. It was the beginning of what has become a distinctively American type.

A school of the Litchfield kind was suited to the condition of American law in the period immediately after the Revolution. In that period the task of legal education was simple. It was no more than to provide competent practitioners in the courts at a time when the chief work of the lawyer was in the trial of causes. Knowledge of the local procedure and ability to move juries were sufficient professional equipment. As yet there was no special requirement of anything which a law school could do better than a law office. Yet the Harvard Law School of this era did succeed in doing something more. At the end of the first decade Stearns could say with truth that he had raised 'the general standard of professional education by introducing a more methodical and thorough course of instruction.' The course of reading and instruction at Harvard was adopted by other schools as well as by private preceptors, and no less than sixty members of the bar in different states had used it for a model. Thus the influence of the School upon legal education began at the outset.

Change from a professional school under the eaves of a university to an academic professional school came with the appointment of Joseph Story as Dane Professor in 1829. By this time a new need had become manifest. English law could not be received exactly as it stood in the English books. There was need of legal provision for many things which were not dealt with by English legislation and which English judges had had no occasion to consider. Much in English law had been given shape for conditions widely different from ours. It was needful to develop a system of law adapted to a new and growing country; to work out certain and detailed legal precepts equal to the requirements of American life. Apprentice-trained lawyers, knowing chiefly the mechanics of procedure and thinking locally, could not meet this demand; only law schools and law teachers could.

Story was a common-law lawyer, and the traditions of English legal teaching ensured that a law school under his guidance would be a professional school. But the philosophical ideas of the time in which Story was trained ensured that a school over which he presided would be a school of law, not a lawyer's office teaching rules of thumb. Also Story's zealous exposition of the doctrines of English law in the light of a natural-law philosophy and of comparative law, enabled the school in which he taught to remain a school of the common law. From Story and Greenleaf to Parsons and Parker and Washburn, thence to Langdell and Ames, and thence to the American law schools of to-day, is a continuous evolution. It has given us a system of legal education which grows out of and expresses the spirit of our law as completely as the continental system expresses the spirit of the modern Roman law, and as the English system expressed the spirit of the mediaeval common law.

Nathan Dane, in 1825, had the vision to see what was needed, and his endowment of the Dane professorship for Story was a turning point in American legal education. The resulting treatises, representing Story's teaching, met the need for an American development of equity and commercial law on the basis of English law, with the help of comparative law and rational philosophical speculation. Also Story's treatises made it possible for new American commonwealths to receive and adopt a general Anglo-American legal system instead of experimenting with codes. Such were the conditions to which the School of Story and Greenleaf (1829–48) responded. The spirit and methods of academic training were combined with the spirit and aims of professional training. Also, what was more important, law was taught and studied from a national or general point of view. The School of Parsons, Parker, and Washburn (1848–70) carried on and in a sense, completed the work of the Story-Greenleaf period. Parsons's treatise on Contracts and Washburn's on Real Property took place with Story's.

In the latter part of the nineteenth century a new need arose. For a time the need was to digest what had been absorbed in the period of growth. For a season the need was, not to create, but to order, systematize, harmonize. Langdell and his pupils and his followers addressed themselves to this need, and met it so thoroughly that the profession is now ready to proceed with assurance in a restatement of the law.[1]

The School of Langdell and Ames (1870–1910), with which the main part of our story begins, had for its task organizing and systematizing the law by the analytical and historical methods, reorganizing teaching method, raising the standards of admission and graduation, and, above all, development of a new type of law teacher. By the end of that period, the methods developed at Harvard had been adopted by the leading university law schools, which in turn had taken the leading place in American legal education.

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[1] Significantly that restatement is chiefly in the hands of law teachers trained by Langdell's method.

During the deanship of Ezra Ripley Thayer (1910–15) the work of the School of Langdell and Ames was carried on, but new tasks and new problems began to give concern; and since the war they have become pressing. As expressed in scholastic terms, these problems are: the training of teachers competent for a new period of legal growth; the training of scholars competent for a new type of legal research; the adaptation of Langdell's 'case system' to the vast mass of material in the law of to-day; the continually increasing number of candidates for admission. As expressed in national terms, the economic unification of America and the transition from a rural-agricultural to an urban-industrial civilization, calls once more for a creative uristic method. The legal materials given shape for nineteenth-century America must be reshaped and adapted to twentieth-century America. The criminal law, conspicuously the weakest point in our polity, must be overhauled. Legislation must be made a more effective instrument of lawmaking. Enforcement of law must be studied scientifically and put on a more assured basis. There must be a better adjustment between law and administration than the traditional common law had provided. There must be an individualizing of the application of legal precepts and of the administration of justice, so as to give the largest scope for the individual life under the conditions of urban society, the technique of which is still to be worked out. There must be a growth of preventive justice, something which has barely begun. For all these things we must rely chiefly upon the law schools. Response to these needs has governed the development of the Harvard Law School in the present century.

In order to meet these problems, the School has had to amplify its purpose. For a century the single professed aim was to conduct what is called a 'national' school, seeking to prepare students to practise in any jurisdiction whose institutions are based upon the English common law.[1] From 1871 to 1928 the statement in the catalogue spoke only of 'such a training in the fundamental principles of English and American law as will constitute the best preparation for the practice of the profession in any place where that system of law prevails.' Since 1928 the announced purpose of the school has included this with two other aims: to train law teachers, and to investigate problems of legal adjustment of human relations and discover how to meet them effectively.

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[1] Down to 1871 there was a further aim of affording legal training to those intending to enter public life or business; but Langdell made the School purely professional.

These three functions have been implicit in the School since the time of Story; and how well the School met them is shown by the long line of treatises that have been published during the last century,[1] and the large number of teachers furnished by the School of Langdell and Ames to national law schools throughout the country.[2] The point is that until the present century it was possible to combine the three functions of professional training, training of teachers, and research, without any formal differentiation. It is no longer possible. In the year 1909–10 provision was made for graduate instruction, and in 1912 there began to be a special programme for the training of teachers. In 1926 endowment for research was provided, and in 1928–29 the first research institute was organized. As things are to-day, 'sound and useful law,' the object proposed by Nathan Dane, calls for more than the occasional writing of a law book by one whose primary task is teaching. It must depend in large part on investigation carried on by legal scholars who devote their lives to functional study of some field in the legal adjustment of human relations, thinking ahead of legislation and adjudication, in order to teach us what the problems are, and how to meet them effectively by means of the law.

2. The Faculty

Since Langdell joined the Faculty in 1870, it has been chiefly composed of professional teachers giving substantially their whole time to the School: men who had chosen law teaching and legal scholarship as their life-work, not retired judges or practitioners. Stearns was a practitioner and teacher-preceptor at the same time. Professor Story was at the same time Justice of the Supreme Court, and Professor Greenleaf went on with his practice. But since 1848 no teacher holding a professorship has tried to combine teaching with regular, continuous practice of his profession. Thus the conception of the professor of law as a 'full-time teacher,' giving substantially his whole energies to the School, goes back to the middle of the nineteenth century at Harvard. Elsewhere it made its way slowly. It had not come to prevail generally until the present century, and full-time teachers were not required for membership in the Association of American Law Schools until 1916.

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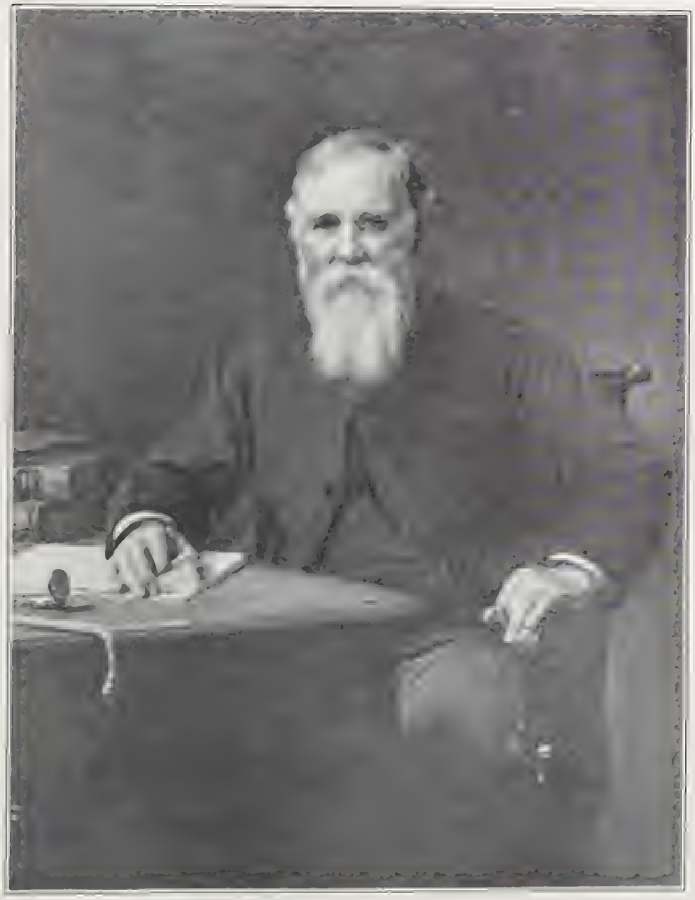
[1] See below, page 497, note.

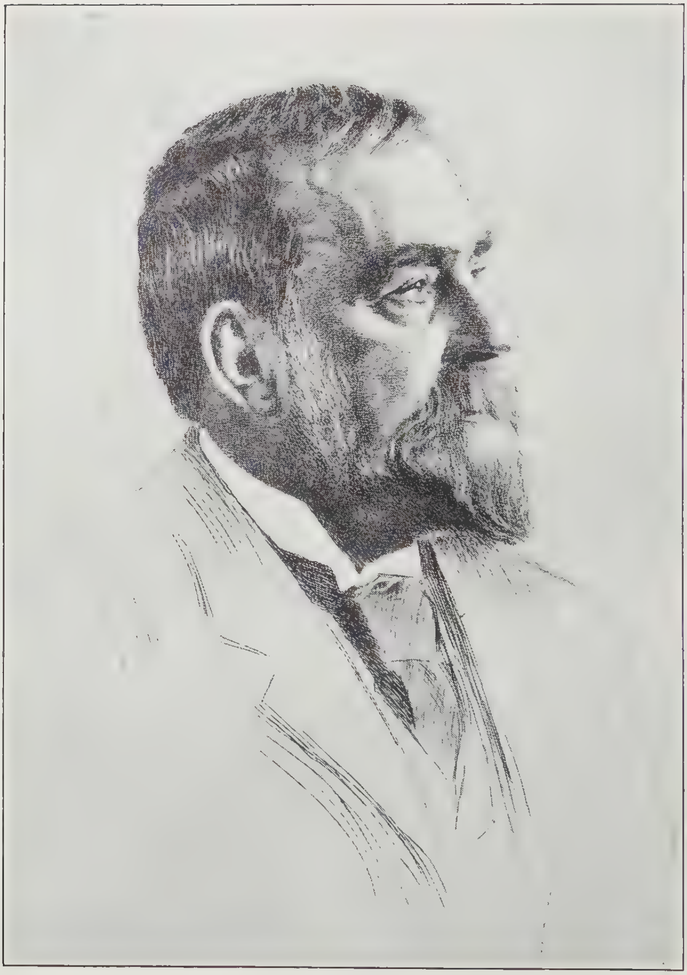
[2] In 1918, about 73 teachers in 36 schools, members of the Association of American Law Schools, had studied under Langdell, or Ames, or both.

Thus before Langdell the change had been made from a judge or practitioner who also taught, to a professor who might have been a judge or practitioner but gave his full time to his chair. A new departure came with the appointment of Langdell. He was a practitioner of experience. But he was chosen by President Eliot for his legal scholarship, his conception of legal education, and his calling to teach, rather than for conspicuous achievement in practice. Soon after his appointment Langdell took a radical forward step. Hitherto no one had been chosen to teach law at Harvard until after a long professional career. Langdell urged the appointment of Ames without any practical experience, because of his remarkable legal mind and success as a college teacher. It is said that the Overseers would not have consented had it not been that the proposed appointment was for a limited term. In his report for 1873–74, President Eliot frankly refers to the appointment as an experiment. The conspicuous success of this experiment made it the settled policy of the School to choose part of its teachers from recent graduates on the basis of scholarship, and with reference to their scholarly and teaching promise. In the present century this policy has become accepted by university law schools.

That an experiment so out of line with the Anglo-American professional tradition should have been even tried, shows the courage of Langdell, and of Eliot who stood behind him. That it succeeded is a testimony to the foresight of Langdell, and the wisdom of Eliot. The one saw the type of teacher that would be called for by the increasing specialization, and by the changed conditions of practice then beginning. The other saw the connection of the proposal with the whole problem of academic professional education in all fields. Indeed, one who reads the annual reports of Langdell in comparison with those of Eliot must feel a conviction that Langdell's work was only part of a large and far-reaching plan of University development. By



LANGDELL



JOHN CHIPMAN GRAY

these two men the last link with the old apprentice training and trade school on the apprentice model was broken.

Christopher Columbus Langdell was born in New Boston, New Hampshire, in 1826. He worked for a time in the mills of Manchester, and worked his way through Phillips Exeter Academy, with some help from his sisters. From Exeter he went to Harvard College. Given leave of absence in his Junior year in order to teach school, he did not return, but after a few months of teaching of and study of law in an office went to the Law School, where he was in residence for three years, although the course then was but eighteen months. He was given his degree of A.B. as of 1851, was made A.M. in 1854, and took his degree of LL.B. in course in 1853. While in the Law School, he acted as librarian and assisted Parsons in the notes to his treatise on contracts. He practised in New York City from 1854 to 1870, when he returned to the Law School as Dane Professor, in succession to Parsons, and became the first Dean of the Faculty. His achievements are part of the history of American legal education. Summarily stated they are: introduction and establishment of the method of teaching from adjudicated cases; advance in requirements for admission, setting up strict standards without regard to those fixed for admission to the bar; a regular system of examinations and definite requirements for graduation; organization of the curriculum on a reasoned basis; organization of the administration of the school; and the building up of a law library, not merely as a working tool for students preparing for a local bar, but adequate to the needs of legal scholars. After fifty years his ideas had been accepted almost universally in this country, and had spread in some measure to other parts of the common-law world. By 1920 it could be said that university law schools in the United States were what he had made them. He retired in 1895 and died in 1906. In his later years Langdell's effectiveness as a teacher was impaired by failing eyesight. He taught chiefly by example. His mastery of the authorities, close reasoning, and exhaustive analysis impressed students and led them to imitate and thus acquire his methods.

When Langdell came, the teachers were Emory Washburn, Nathaniel Holmes, Charles Smith Bradley, and John Chipman Gray.

Emory Washburn (1800–77) had practised for thirty-four years, and had been Governor of Massachusetts, when he came into law teaching. Associated with Parsons and Parker for fifteen years, and for six with Langdell, he was a link between the old School and the new.

Nathaniel Holmes (1815–1901) had practised twenty-six years and been a judge of the Supreme Court of Missouri, when he was appointed to the Royall Professorship to succeed Parker. He resigned in 1872 because of unwillingness to accept Langdell's ideas.

Charles Smith Bradley (1819–88) had practised twenty-five years and been Chief Justice of Rhode Island, when he was appointed lecturer. He succeeded Washburn as Bussey Professor but retired after three years. He was the last of the type of teacher who had made the school under Story and Greenleaf, and later under Parsons, Parker, and Washburn.

John Chipman Gray (1839–1915) was in point of time the first of the great teachers who made the reputation of the School under Langdell and Ames, and also the last survivor. He graduated from Harvard College in 1859, and from the Law School in 1861. He served throughout the Civil War, rising to be Major and Judge Advocate. After four years at the bar in Boston, he was made lecturer in 1869 and thrice reappointed. In 1875 he became Story Professor, and was Royall Professor from 1883 to 1913. In respect of being chosen originally on the basis of scholarship and qualifications for teaching law rather than for conspicuous achievement in practice during a long career at the bar, he belongs to the School of Langdell and Ames. But in continuing to practise while holding his professorship, and keeping up a connection with a law office throughout the forty-one years of his consecutive teaching, he belongs to the older School. Indeed, it was some time before he gave his adhesion to Langdell's method of instruction. For many years he lectured on the basis of a list of cases assigned for reading, with occasional questions. Ultimately he came to a method of informal discussion of the cases and of questions put to him or raised by him. His work was in the Law of Real Property and in jurisprudence. His ideal of teaching was put in the letter to his students on his retirement: 'I have always felt that on both sides it was not an attempt to show how much we knew, or how smart we were, but that we were fellow-students trying to get to the bottom of a difficult subject.'

During Langdell's deanship the following appointments were made to full-time teaching positions: James B. Ames (of whom presently in another connection), James B. Thayer, Oliver Wendell Holmes, William A. Keener, Jeremiah Smith, Joseph H. Beale, Samuel Williston, and Eugene Wambaugh. Langdell, Ames, Gray, and Thayer were the conspicuous legal scholars and teachers at the School during the period of its reorganization by Langdell, and of its firm establishment by Ames on the basis on which Langdell had put it.

James Bradley Thayer (1831–1902) graduated from Harvard College in 1852, and from the Law School in 1856. He then practised in Boston until 1874. In 1873 he was made Royall Professor to succeed Nathaniel Holmes, and in 1883 Weld Professor in succession to Oliver Wendell Holmes. His great work as a legal scholar was in Constitutional Law and the Law of Evidence, in both of which fields he left a conspicuous mark. He was the first President of the Association of American Law Schools. It has been said of him as a teacher that 'his success with his students was not that of the magnetic teacher whose very personality inspires enthusiasm in the work. It lay in the admiration and respect of many successive classes for his mastery of what he taught, for the power and accuracy of his thinking, and for the modesty and fineness of the man.'

Oliver Wendell Holmes (b. 1841) graduated from Harvard College in 1861, and from the Law School in 1866. He served throughout the Civil War, rising to be Lieutenant-Colonel. He practised in Boston from 1867 to 1882, was Lecturer on Constitutional Law 1871–1873, edited the twelfth (now standard) edition of Kent's Commentaries, and delivered a notable series of lectures in the Lowell Institute, published as the Common Law. In 1882 he was appointed to the newly founded Weld Professorship, but in 1883, being appointed to the Supreme Judicial Court of Massachusetts, gave up law teaching for a judicial career which has put him with the handful of great judges who have shaped our law. Justice of the Supreme Judicial Court of Massachusetts, 1883–99, Chief Justice of Massachusetts, 1899–1902, and appointed Justice of the Supreme Court of the United States in 1902, during some forty-seven years of judicial service he has written opinions on every branch of the law, and especially on constitutional law, which will always rank among the classics of the reports. He has ever been a staunch friend of the School, and was President of the Harvard Law School Association from 1911 to 1922.

William Albert Keener (1856–1913) was educated at Emory College, Georgia, and the Harvard Law School (LL.B. 1877). After four years of practice in New York City, he was made Assistant Professor of Law in 1883, and in 1888 became Story Professor. He resigned and returned to New York in 1890, becoming Professor of Law at Columbia (1890), Kent Professor, and Dean of the Law School. In 1902 he was appointed Justice of the Supreme Court of New York and resigned his chair. His vigorous advocacy of Langdell's method of teaching was no mean factor in its reception in other law schools. Keener was a natural teacher, at his best with first-year men, who, it has been said, 'began by hating him, presently admired him grudgingly, and by the middle of the year swore by him.'

Jeremiah Smith (1837–1921) was graduated from Harvard College in 1856 and studied at the Harvard Law School, 1860–61. In 1867 he became Justice of the Supreme Court of New Hampshire, and resigned in 1874 on account of ill health. From 1890 to 1910 he was Story Professor. The appointment of Judge Smith, after the age of fifty, and after a long career at the bar and on the bench, was a reversion to the type of teacher that had been taken to be indispensable before Langdell. In his case the appointment proved a happy one. Through his teaching, the teaching of his pupils, and his second volume of Ames and Smith's Cases on Torts, he exercised a distinct influence upon the development of the law of torts, one of the growing subjects of the last generation as well as of the present.

Eugene Wambaugh (b. 1856) was educated at Harvard (A.B. 1876, LL.B. 1880), practised at Cincinnati from 1880 to 1889 and then became professor in the Law School of the State University of Iowa. Three years later he was appointed Professor of Law at Harvard, and served as Langdell Professor from 1903 to 1925. He was one of the pioneers in extending Langdell's method to other schools, and his Study of Cases (1892) is a useful introduction thereto. During the World War he was in the office of the Judge-Advocate General, leaving the service with the rank of Colonel. In the Law School his chief work was in Agency, Constitutional Law, and International Law.

When Ames became Dean, the full-time teachers were Gray, Thayer, Smith, Wambaugh, Beale, and Williston. The appointments to full-time professorships under Ames were J. D. Brannan, E. H. Strobel, J. I. Westengard, Bruce Wyman, and Edward H. Warren.

James Barr Ames was born in Boston in 1846. He was graduated from Harvard College in 1868, studied a year in Germany, and at the Law School from 1870 to 1872 (LL.B. 1872). He had been teaching in Harvard College while a student in the Law School and stayed for a graduate year, continuing his college teaching. He was made Assistant Professor in 1873, Professor in 1877, Bussey Professor in 1879, and Dane Professor in 1903. In 1895 he succeeded Langdell as Dean. He died in January, 1910.

Ames had a genius for teaching by Langdell's method, and to him much of the success of that method must be attributed. As a matter of principle, he taught almost every subject in the law, taking up one subject after another, devoting a number of years to each. In the end, he is likely to be identified specially with Trusts, Equity, and Legal History. Next to his teaching, and the notes to his case books, his most significant contribution to the law is probably the searching critique to which he subjected the negotiable instruments law. For the rest, his administration will be remembered for the conception of the new relation which he established between Dean and students, for his development of the Library, and for restoring good understanding between the School and the profession, after the misunderstanding which went along with the trying-out and reception of Langdell's reforms. In legal scholarship he stood for the historical method, as Langdell had stood for the analytical.

Joseph Doddridge Brannan (b. 1848) was educated at Harvard (A.B. 1869, LL.B. 1872). Between College and Law School he studied for a year in Munich. He practised in Cincinnati from 1873 to 1898 and during the last two years was professor in the University Law School there. In 1898 he came to the Harvard Law School, and served as Bussey Professor from 1908 to 1917. His chief work was in the Law of Negotiable Instruments, on which subject his Negotiable Instruments Law is the standard authority.

Edward Henry Strobel (1855–1908) was graduated from Harvard College in 1877, and from the Law School in 1882. He began to practise in New York City but in 1885 an appointment as Secretary of the Legation at Madrid turned him to a diplomatic career. He was Chargé d'Affaires at Madrid, went on a special mission to Morocco, became Third Assistant Secretary of State of the United States in 1893, Minister to Ecuador in 1894, and soon thereafter Minister to Chile. He was arbitrator in a controversy between Chile and France. Thus he was singularly fitted for the Bemis Professorship, for which it was required that the incumbent should have had some connection with public or diplomatic life. He was Bemis Professor from 1898 to 1906. In 1903 he was given leave of absence to take the post of General Adviser to the Siamese Government, and in 1906 he resigned his professorship. Thus began a connection of the Law School with Siam, which has endured.

Jens Iverson Westengard (1871–1918) had a common school education, and being unable to go to college, became a stenographer. In 1895 he came to the Law School as the last of those who, as things were then, could be admitted without a college degree by taking examinations in Latin, a modern language, and Blackstone. Although earning his way as a stenographer, and later as a tutor, he took high rank at once, and graduated with honors in 1898. The following year he was made Assistant Professor, but resigned in 1906 in order to go to Siam as assistant to Professor Strobel, on whose death he became General Adviser to the Siamese Government. In 1915 he returned to the Law School as Bemis Professor of International Law.

Bruce Wyman (1876–1926, A.B. 1896, LL.B. 1900) was Lecturer from 1900 to 1903, Assistant Professor from 1903 to 1908, and Professor from 1908 to 1913. He had maintained a consulting practice during his professorship, and after his resignation practised in public utilities cases and before administrative boards and commissions. His chief work was in the Law of Public Utilities and in Administrative Law.

Ames was succeeded as Dane Professor and Dean by Ezra Ripley Thayer (1866–1915, A.B. 1888, LL.B. 1891), son of James Bradley Thayer. After a year in Washington as Secretary to Mr. Justice Gray, he practised in Boston from 1892 to 1910, giving up practice in the latter year to take up law teaching and the work of law-school administration. He remained active in bar associations, state and national, and was one of the committee which drafted the code of professional ethics of the American Bar Association. In 1913 he declined appointment to the Supreme Judicial Court of Massachusetts. By this time the pressure of administrative routine had become very heavy, so that he had little opportunity to show the world his powers as a legal scholar; but he had perfected himself as a teacher, and had he been spared to reorganize the administration of the School so as to have some reasonable time at his disposal for scholarly work, would unquestionaly have written much of high value. His untimely death, after but five years in his chair, left no more than some articles in the Law Review, each of the highest order, as monuments to his ability and scholarship.

Under Ames, and even more under Thayer, the individual student came to demand a very large part of the Dean's time. Thayer visited the sick, gave counsel to all who were in difficulties of any sort, and devoted himself to the students' problems to an extent incompatible with the then size of the student body. Also he came to head the School at a time when, along with maintaining the achievements of Langdell and Ames in a period of unrest, it was becoming necessary to meet new problems of the social and economic order, and hence to reshape the legal materials of the nineteenth century for new purposes. Although inclined by training and environment to keep strictly to the lines on which the School had developed in the past, he saw the added service which it was called on to perform in twentieth-century America, and his sensitive conscience bade him heed the call. Thus he sought to hold fast to the work of training lawyers for the practice of their profession, while recognizing that much more was coming to be demanded by the circumstances of the urban-industrial society of the present century.

When Thayer became Dean the full-time teachers were Smith, Gray, Brannan, Wambaugh, Beale, Williston, E. H. Warren, and Wyman. Before the opening of the school year 1910–11, Roscoe Pound was made Story Professor and Austin W. Scott was made Assistant Professor. The appointments made during the administration of Dean Thayer were Joseph Warren, Felix Frankfurter, and J. I. Westengard (reappointed). At this time Beale and Williston, who had begun teaching under Langdell, and had been associated in the Faculty with Langdell, Ames, Gray, and Thayer, were the conspicuous teachers. It may be suspected that those who look back upon the first two decades of the present century will refer to the School of that time as the School of Beale and Williston.

Joseph Henry Beale (A.B. 1882, LL.B. 1887) practised in Boston from the year of his graduation to 1892. His service in the

Law School began in 1890. From 1908 to 1913 he occupied the Carter chair, and since that time has been Royall Professor. In 1902 he was given a year's leave of absence to go to the University of Chicago to act as professor in and Dean of the newly instituted Law School of that University. For many years he worked in Criminal Law. He has taught almost every subject in the curriculum, and did pioneer work in organizing the courses in Public Utilities and in Taxation. But his life-work is Conflict of Laws, in which he brought out the first case book, gave the course the place which it now holds in curricula everywhere, and is universally known as the master. He is Reporter on Conflict of Laws for the American Law Institute.

Samuel Williston (A.B. 1882, LL.B. 1888) was Secretary to Mr. Justice Gray, practised in Boston, and has been teaching in the Law School since 1890, as Dane Professor since 1919. Williston has been active in the work of the Conference of the Commissioners on Uniform State Laws, and drew the Warehouse Receipts Act, Sale of Goods Act, Bills of Lading Act, and Certificates of Stock Act. He has taught for the most part subjects of commercial law, and his energies have gone chiefly into the Law of Sales, and Contracts, on which he has written the standard treatises. He is Reporter on Contracts for the American Law Institute.

Edward Henry Warren (A.B. 1895, LL.B. 1900) practised in New York until 1904, when he received his first professorial appointment. He held the Weld chair from 1919 to his retirement in 1929. His chief work was in the Law of Corporations, on which he wrote an important treatise.

On the death of Ezra Thayer, Scott acted as Dean until the appointment of Roscoe Pound in March, 1916. Pound was educated at the University of Nebraska (A.B. 1888, PH.D. 1897), attended the Harvard Law School one year, was admitted to the bar at Lincoln, Nebraska, in 1890, and practised there until 1901, when he became in succession Commissioner of Appeals in the Supreme Court of Nebraska, Dean of the Law School of the University of Nebraska, Professor of Law at Northwestern and at Chicago, Story Professor at Harvard (1910), and Carter Professor (1913).

When Pound became Dean in 1916 the full-time teachers were Brannan, Wambaugh, Beale, Williston, Westengard, E. H. Warren, Joseph Warren, Frankfurter, and Scott. Joseph

Warren (A.B. 1897, LL.B. 1900) has taught in the School since 1909, became Bussey Professor in 1919, and Vice Dean in 1928. Felix Frankfurter (LL.B. 1906) was Assistant to the United States District Attorney for the Southern District of New York from the year of his graduation to 1910, and law officer of the War Department Bureau of Insular Affairs from 1911 to 1914, when he was appointed Professor of Law. Since 1920, he has been Byrne Professor of Administrative Law. During the World War he was Assistant to the Secretary of War and counsel to the President's Mediation Commission. Afterward he was Assistant to the Secretary of Labor and Chairman of the War Labor Policies Board. Austin Wakeman Scott (LL.B. 1909) has taught in the School since his graduation (since 1919 as Story Professor), except during the year 1911–12, when he acted as Dean of the College of Law of the State University of Iowa. He is Reporter on Trusts for the American Law Institute.[1]

Under Ames the need of adding new courses, to meet the rapid growth of the law, required a number of temporary appointments, mostly of practitioners at the Boston bar who gave part of their time to teaching. Some of these men afterwards went permanently into teaching and achieved distinction. Many others obtained distinction at the bar. Since 1920 the uniform practice has been to have all courses counting toward a degree given only by full-time teachers on permanent appointment: a logical application of the policy inaugurated by Langdell and continued by Ames. As things are to-day, the law teacher may not hope to serve two masters. No one while engaged in a busy practice may expect to keep abreast of legal scholarship. A teacher of sufficient capacity to make a strong legal scholar and successful law teacher, if he seeks to do so, is sure to acquire a practice inconsistent with the service demanded by the School. Moreover, the teachers should be at the School, accessible to the students for consultation, at least the greater part of the time during the school year. Their most valuable work is often done through informal consultations and explanations. Nor can a part-time teacher do the work of research and legal writing which is required of the modern law teacher.

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[1] Since 1915, the appointments to full-time teaching positions have been: Arthur D. Hill (LL.B. 1894), 1915–19; Zechariah Chafee, Jr. (LL.B. 1913), and Chester A. McLain (LL.B. 1915, S.J.D. 1917), 1916; Morton C. Campbell (LL.B. 1900, S.J.D. 1915), 1919; Manley O. Hudson (LL.B. 1910, S.J.D. 1917), 1918; Francis B. Sayre (LL.B. 1912, S.J.D. 1918), 1917; Calvert Magruder (LL.B. 1916), 1920; William E. McCurdy (LL.B. 1921, S.J.D. 1922), 1921; John M. Maguire (LL.B. 1911) and Theodore F. T. Plucknett (LL.B. Cambridge, 1920), 1923; James A. McLaughlin (LL.B. 1916), 1924; Edmund M. Morgan (LL.B. 1905), Francis H. Bohlen (LL.B. Pennsylvania, 1892), Thomas R. Powell (LL.B. 1904), Josef Redlich (J.U.D. Vienna, 1891), and James B. Thayer (LL.B. 1924, S.J.D. 1925), 1925; James M. Landis (LL.B. 1924, S.J.D. 1925), 1926; Roger S. Foster (LL.B. 1924), 1927; Edwin M. Dodd (LL.B. 1913), George K. Gardner (LL.B. 1914) and John J. Burns (LL.B. 1925, S.J.D. 1926), 1928.

Quite another matter is the bringing in of scholars to deliver special courses of lectures not immediately part of the professional curriculum. Two such courses deserve special mention. Albert Venn Dicey, Vinerian Professor of English Law at Oxford, was in 1898 appointed Lecturer on the Changes in English Law during the Nineteenth Century. His lectures were afterward published as Lectures on the Relation between Law and Public Opinion in England during the Nineteenth Century. Sir Paul Vinogradoff, Corpus Christi Professor of Jurisprudence at Oxford, 1903–25, gave a course on Comparative Ancient Law in 1906–07.

More recently a practice has grown up of bringing to the School distinguished teachers from the University of Cambridge to conduct graduate courses or seminars. Thus Percy H. Winfield, now Rouse-Ball Professor of English Law, was Lecturer on English Legal History in 1923; William W. Buckland, Regius Professor of the Civil Law, lectured and conducted a graduate seminar in Roman Law in the second half of the school year 1924–25; and A. Pearce Higgins, Whewell Professor of International Law, lectured and conducted a seminar in International Law in 1926–27.

3. Teaching

In the modern world law teaching takes three forms: the continental academic type running back to legal education in ancient Rome; the English modified-apprentice type going back to the mediaeval conception of the profession as analogous to a craft; and the American academic professional type.

In the maturity of Roman Law in the ancient world, the writings of the chief jurisconsults of the classical era had been given statutory authority. It was the task of the teacher to interpret and expound these authoritative texts. Likewise in mediaeval Europe, the Corpus Juris was a body of binding legislation, admitting only analysis of the text and interpretation. As academic teaching of Roman Law became the practical teaching of law for Western Europe, there developed two characteristics which persist to this day on the Continent. It is primarily a teaching of the art of using authoritative texts as the basis for administering justice. The law has been codified in substantially the whole of the Roman-Law world. But the modern codes assume a background of the modern Roman law which is the common law in all the jurisdictions in which these codes obtain. The method of teaching law under these codes is an academic method, by lectures, study of academic commentaries on the texts and of doctrinal treatises. The law taught is a university-made law.

From the beginning English law has been a law of the courts. The great names of English law are the names of judges, not teachers. All teaching of law must be primarily a teaching of the traditional technique of developing the received legal materials, and of finding in them the grounds for decision of particular cases. In England, the art to be taught is a lawyer's technique of developing and applying the materials to be found in the law reports, not a teacher's technique of developing and applying written texts. Thus English law teaching has been a developed-apprentice teaching carried on by practitioners.

If the modern Roman law is jurist-made, and English law is court-made, American law has been given shape by courts, guided and inspired by jurists who worked scientifically in schools upon a proved body of experience in the administration of justice. In American constitutional law, federal and state, we have had the same problem of developing a body of law through enduring texts, to which the science of the Roman Law has been addressed for centuries. Here judges and teachers have each had a part. Thus there are two elements in our technique as distinctly as there is but one element in that of each of the others. As American law teaching grew to maturity, it was inevitable that it should develop its own method.

In the school of Stearns (1817–29) instruction took the form of lectures and of apprentice work as in a law office, with the advantage of the School Library, whereas in most law offices of the time books were relatively few. Stearns's lectures supplemented the office reading and the apprentice work of copying pleadings, conveyances, and legal documents. What Stearns called the course of instruction was no more than a course of reading such as a student might have pursued in a lawyer's office.

A distinct change comes with the endowment of the Dane Professorship and the appointment of Story thereto in 1829. Under Story, it is true, Professor Ashmun kept on much in the manner of Stearns. But with the advent of Greenleaf in 1833 came subdivision of the School into classes, thus departing decisively from the apprentice model. In 1846 this departure was carried still further by laying out courses in different subjects, after the manner of a college curriculum, in place of study of particular treatises after the manner of reading in an office. From 1846 to 1870 there was a threefold course of study. The first part was elementary, study of Blackstone's and Kent's Commentaries, and was given each year. The second part, comprising what were regarded as the fundamental subjects (Real Property, Equity, and Constitutional Law), was given each year following the elementary part. The third part, comprising what were held to be the less fundamental subjects, was given concurrently with the first and second parts, but not the whole in any one year. For eight of these subjects, Pleading, Bills and Notes, Domestic Relations, Evidence, Shipping and Admiralty, Bailments, Wills and Administration, and Partnership, the alternation was kept up with reasonable regularity; for others, such as Insurance, Sales, and Agency, a two-year interval sometimes intervened. Corporations, significantly, was given but seven times in twenty-four years.

Teaching method developed with the curriculum. Before 1836 students came and went as they saw fit, exactly as they might have done in a lawyer's office. There was no regular time of entering or of leaving. In 1836, although there was still much irregularity in entering, it became the practice not to leave before the end of the term, in January or July. This made for more effective instruction. What was more important, Story and Greenleaf laid stress upon the scientific aspects of the law. As may be seen from Story's books, he relied much upon comparative law, tried the traditional English doctrines by comparison with the modern Roman law, and sought to demonstrate their accord with the ideal principles which in the philosophy of his time stood for universal law. What had been good in the apprentice system, the close personal contact between preceptor and pupil, remained. This contact necessarily declined under

Parsons, Parker, and Washburn (1848–70), when the several professors came to meet the students as a body only in the lecture rooms. For the rest, each was in his room studying and writing, receiving the students only one by one.

From Greenleaf's day until the coming of Langdell, the curriculum changed little. The change was rather in teaching method. There was study of required texts, with quizzes in class upon the texts and oral comments by instructors. Gradually this developed toward a system of lectures on the several subjects, with an occasional quiz on the texts. In time this system became, as it were, stereotyped. No attendance and no preparation were required. There was no test of the work done. New subjects of the first importance in the law could arise and take a conspicuous place in the reports, yet be unnoticed by the teachers. Such was the case with the Law of Torts, on which the first textbook was published in 1859; and yet the school did not recognize it until Langdell's reorganization.

Such a condition called for change, and the change came with Langdell. His first act was to rearrange the curriculum on a logical plan. Instead of teaching all the fundamental subjects in alternate years to a mixed class, first-year students took first-year subjects, and were not allowed to take second-year subjects until the examinations of the first year had been passed. The elementary course in Blackstone and in Kent was given up. Instead, the students picked up the elementary conceptions, and acquired the vocabulary of the law as they went along, and acquired a mastery of them by working out their application to concrete problems and their use in reported decisions. The Law of Torts, the coming subject, was included in the first-year course along with the Law of Real Property, Contracts, Civil Procedure, and Criminal Law. These five have stood ever since where Langdell put them, and this conception of the beginning of a legal curriculum has come to prevail generally. Equity and Constitutional Law, although fundamental subjects, were rightly regarded as not beginning subjects and were put later in the course.

To understand the method of teaching introduced by Langdell, it is needful to contrast it with the methods which it superseded, namely, apprentice instruction in a law office, and teaching in a law school from textbooks and by lectures and quizzes on the basis of textbooks. It must be remembered that in the

Anglo-American legal system textbooks have no authority. Only statutes and judicial decisions have authority. The textbook can do no more than bring together, arrange, and comment on these authoritative materials. With these things in mind Langdell's statement of the basis of his method speaks for itself. In 1886 he said:

> If law be not a science, a university will best consult its own dignity in declining to teach it. If it be not a science, it is a species of handicraft, and may best be learned by serving an apprenticeship to one who practises it. If it be a science, it will scarcely be disputed that it is one of the greatest and most difficult of sciences, and that it needs all the light that the most enlightened seat of learning can throw upon it. Again, law can only be learned and taught in a university by means of printed books. If, therefore, there are other and better means of teaching and learning law than printed books, or if printed books can only be used to the best advantage in connection with other means — for instance, the work of a lawyer's office, or attendance upon the proceedings of courts of justice — it must be confessed that such means cannot be provided by a university. But if printed books are the ultimate sources of all legal knowledge; if every student who would obtain any mastery of law as a science must resort to these ultimate sources; and if the only assistance which it is possible for the learner to receive is such as can be afforded by teachers who have travelled the same road before him, — then a university, and a university alone, can furnish every possible facility for teaching and learning law. I wish to emphasize the fact that a teacher of law should be a person who accompanies his pupils on a road which is new to them, but with which he is well acquainted from having often travelled it before. What qualifies a person, therefore, to teach law is not experience in the work of a lawyer's office, not experience in dealing with men, not experience in the trial or argument of causes, — not experience, in short, in using law, but experience in learning law; not the experience of the Roman advocate or of the Roman praetor, still less of the Roman procurator, but the experience of the Roman jurisconsult.

In saying that all available materials of the law are contained in printed books, Langdell meant that as between learning from imitation of one's elders in a law office, and learning from study of the reported decisions of the courts, the materials of a science of law were to be found in the books. Questions which have arisen in the present century as to the need of going outside the authoritative legal materials in order to meet the exigencies of social transition, had not then arisen. His proposition was that the law was to be learned through study of the authoritative legal materials themselves, not by study of what others had said about them, no matter how learned or how eminent those others might be. The traditional legal precepts, the authoritative technique of developing and applying them in the light of the received ideals, were set forth authoritatively in the law reports. Hence they should be studied at first hand as they appeared in those reports, not at second hand through some one's exposition of them. This was not revolutionary from a lawyer's standpoint, for the great lawyers had always mastered the reports and built up their systems on that basis. But it was revolutionary in law teaching. Such, in brief, was the 'case system.'

It was some time before Langdell could convince all his own colleagues. It was twenty years before one of his pupils took his method to another great law school and established it there. Meanwhile, many who had studied under Langdell and Ames had carried it to other schools. By 1900 Stanford had definitely set up a school of Langdell's type. In 1902 Beale had organized the newly instituted law school of the University of Chicago upon Langdell's model. Michigan turned decisively to the case method under Dean Bates about 1910; Columbia after 1890; Yale about 1916. From these schools, next to Harvard, have come the great majority of the law teachers of to-day. In little more than a generation Langdell's ideas had prevailed; his 'case method' was decisively established; the apprentice idea was wholly abandoned.

In Langdell's time it was still possible to put all, or substantially all, the authoritative materials on any fundamental point before the student in a case book. Thus Langdell's Cases on Contracts (1871) brought together all the cases on the crucial problems of offer and acceptance. It was ceasing to be possible or profitable to do this even when Langdell compiled his first case book. Ames changed the plan in his case books published between 1874 and 1905. He chose so far as possible the cases from which doctrines started, and printed them along with typical cases on the crucial points, with citations of all the other cases in the common-law world grouped about the type cases. To-day the development of an apparatus of digests of and indexes to decisions, which did not exist in Ames's day, makes a case book of this type unnecessary. The case book of the present takes up the fundamental doctrines of the subject and selected problems, with typical cases for the one and cases chosen from each side for the other, and such citations as will bring out special applications or special problems bearing on the theory of the fundamental doctrines. The material on every subject of the law has become so vast that the case book must select and organize, where in Langdell's day the student could be given the whole mass to organize for himself.

Another important change should be noted. In 1888, when Gray began the publication of his pioneer collection of Cases on Property, he could assume confidently that a decision of the highest court of one of our jurisdictions, unless quite out of line with established ideas, would be followed in the others. Hence he could cover the whole field of property with what might reasonably be taken for authoritative statements. There is no longer any such assurance. The materials of assured general authority in common-law jurisdictions are of limited extent. For the rest, we have no more than competing starting points for legal reasoning. Consequently, in the present century monumental collections such as Gray's Cases on Property, or Thayer's Cases on Constitutional Law, are not usable as the basis of instruction. Case books must now be devised for the purpose of bringing students to learn how to discriminate the authoritative materials, and to acquire those settled fundamental propositions without which legal questions may not be treated in a lawyerlike way. Also they must be directed to developing in students a power of using the received technique of the common law upon the authoritative legal materials, so as to be able to reach assured judgments as to how courts will decide, and to make convincing arguments to courts as to why they should so decide.

Yet this change in the content and make-up of case books since Langdell in no wise affects the change which he brought about. For the purposes of to-day, instruction on the basis of decided cases continues to be most effective. Study of how courts have decided typical cases, analysis of the process of decision, observation of how the teacher analyzes that process in particular cases, discussion of the analysis with the teacher and fellow students, and, above all, practice in answering hypothetical cases and writing out the reasons for the solution, have proved themselves by experience as the means by which the aims of to-day may be attained. Undoubtedly these methods put a heavy burden upon the teaching staff, and in consequence signs of restlessness on the part of teachers are observable. It is much easier to lecture than to conduct the sort of exercise, sometimes discussion, sometimes lecture, sometimes a putting of hypothetical cases to be canvassed without any dogmatic solution, which these methods call for. Moreover, the reading of examination books where these methods obtain is an irksome task. But Langdell's conception of an examination in the form of hypothetical cases calling for reasoned solutions has proved one of the most fruitful features of his method of teaching. Such an examination is not a mere measure of work. It is a measure of achievement. It rounds off the year's work with an exercise which fixes the results of that work as permanent acquisitions.

4. Graduate Instruction and Research

Under Langdell, training for practice of the profession was the sole explicit aim of the Law School. In the present century it became increasingly apparent that the School was not doing its whole duty when it had sent forth well-trained men to take up the practice of the law. There was a growing consciousness that the lawyer had more to do than earn a livelihood by faithfully advising and representing his clients. To-day he has a creative task before him, to be carried out in bar associations, in the legislature, and as a citizen, in maintaining the law as an effective instrument of justice, and to further its development. Nor is the task of a national law school done when it has bred lawyers equal and disposed to that work. It has to organize and carry forward the research which must go before creative law-making.

Under Ames a continually increasing number of graduates began to teach in other law schools. Also new movements in the law were calling for a development of the science of law beyond the possibilities of the analytical and historical jurisprudence of the nineteenth century. Ames, in particular, was impressed with the renewed insistence on the ethical element in law which was manifest at the beginning of the present century. There was need of providing for further training of those who had already chosen law teaching as their life work. There was coming to be need of providing a more specialized training for graduates in law who intended to go into teaching. These needs were the first to attract attention, and led to the organization of graduate instruction.

A project for graduate courses leading to a graduate degree was first considered in 1906. After three years of discussion in the Faculty, it was recommended to the Corporation in 1909, and the degree of S.J.D. (Doctor of Juridical Science, or Doctor of the Science of Law) was established; but the one year's course of study for it was not organized until 1911. From 1912 to 1923 candidates for the S.J.D. usually studied Roman Law and Comparative Law, Jurisprudence, Administrative Law, International Law, History of English Law, or topics in the Conflict of Laws. This work proved too heavy. Of thirty-three who sought the doctorate in the first five years, only eighteen, including twelve teachers in other law schools, were successful. This led to the establishment of the degree of Master of Laws (LL.M.) in 1923, a year's course designed primarily for students who intended to practise; while the doctor's course, reorganized primarily for teachers of law, became more flexible. An essential part of it is directed research, or an approved programme of intensive study in some subject which the candidate expects to teach.

By 1928, the development of graduate seminars and the provision in the new endowment for research institutes, led to a new plan. A seminar in Jurisprudence had grown up as a supplement to the lectures. Later a seminar in Roman Law grew up in the same way. Administrative Law was given as a seminar course after 1920. Since that time several other seminars have been added, primarily for graduates, but open to third-year students of high rank, with the consent of the Dean and the Instructor. Under the plan adopted in 1928, the requirements for the master's degree remained much as before, and that degree became prerequisite to candidacy for the doctorate, unless the applicant had taught law for three years, or shown his fitness for research. For the doctorate a general oral examination, and two written examinations, all to be passed with distinguished excellence, are prescribed in addition to a thesis. Thus, after fourteen years of cautious development, graduate study in law has been put upon a solid basis.[1]

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[1] The Directory of Law Teachers teaching in schools that are members of the Association of American Law Schools shows 136 former members of the Harvard Law School, 71 of whom had done graduate work there.

In 1926 an endowment of $2,250,000 was raised for research. In the programme for carrying out the purposes of this endowment, distinction is made between mere search by students for what is already known, and research, by those suitably trained, in order to get at new, hidden, or unrecognized truth through investigation scientifically conducted and directed. There are two main types of work to be provided for. One is the writing of books on various topics or items of the law. Dane's gift provided for this, and the long succession of treatises which have come forth from the school since Story's time speaks for itself.[1] To these treatises a long line of case books may be added, since the latter certainly have often involved research of the first order, and many of them have had quite as real an influence upon the growth of the law as the classical textbooks of the time before Langdell. The endowment raised in 1926 will make it possible for teachers in the school to continue this notable tradition of text writing.

More is demanded by the law of to-day. There is call for study of the functioning of law, of legal institutions, legal doctrines, and legal precepts, both in general and in particular fields of the law, and in respect of their background, their operation, and their possibilities, with a view to furthering justice and the purposes of the legal ordering of society. Toward these ends research institutes were made possible by the endowment of 1926, and by 1928 the first institute was about to be organized.

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[1] The chief items are worth recounting: Story, on Bailments (1832, nine editions), on the Constitution (1833, six editions and translation into French), on the Conflict of Laws (1834, eight editions), on Equity Jurisprudence (1836, fifteen American and three English editions), on Equity Pleading (1838, ten editions), on Agency (1839, nine editions), on Partnership (1841, seven editions), on Bills of Exchange (1843, four editions and translated into German), on Promissory Notes (1845, seven editions); Greenleaf, on Evidence (1842–53, seventeen editions); Parsons, on Contracts (1853–55, nine editions), on Partnership (1867, four editions), on Promissory Notes and Bills of Exchange (1868, two editions); Washburn, The American Law of Real Property (1860–62, six editions), The American Law of Easements and Servitudes (1863, three editions); Langdell, Brief Survey of Equity Jurisdiction (1904, two editions); Gray, on Restraints on the Alienation of Property (1883, two editions), on The Rule Against Perpetuities (1886, four editions), The Nature and Sources of the Law (1909, two editions); Thayer, Preliminary Treatise on Evidence (1898); Ames, Lectures on Legal History (posthumous, 1913); Wyman, on Public Service Companies (1911); Beale, Law of Foreign Corporations (1904), Law of Innkeepers and Hotels (1906); Beale and Wyman, Railroad Rate Regulation (1906, two editions); Brannan, The Negotiable Instruments Law (1908, four editions); Williston, on Sales (1909, two editions), on Contracts (1920–22); E. H. Warren, Corporate Advantages without Incorporation (1929).

5. The Student Body

Isaac Parker's plan (1816) called for a school 'for the instruction of resident graduates.' It was a long time before this ideal of a purely graduate professional school could be realized. President Eliot puts the matter well in his report for 1875–76:

> The Faculty have greatly advanced the standard of the Law School since 1869–70; but it will still be some time before they reach the level upon which Judge Story proposed to place the school in the year 1829–30 — the first year in which he held the Dane Professorship. In the annual catalogue for that year, under the head of the Law School (p. 24), the following announcement was made: 'Gentlemen who are graduates of a college will complete their education in three years: those who are not graduates will complete it in five years.' For five years this was the avowed policy of the school; but, in the catalogue for 1834–35, the sentence just quoted no longer appeared; and in its stead the following announcement was made (p. 29): 'The degree of Bachelor of Laws is conferred by the University on students who have completed the regular term of professional studies required by the laws or rules in the state to which they belong, eighteen months thereof having been passed in the Law School of this institution.' From this position the School gradually declined by a series of small descents, until, in 1869–70, all persons who had been eighteen months in the School were entitled to the degree of Bachelor of Laws without examination or inquiry of any sort into their attainments. The rapid rise of the School from this humiliating position during the past seven years gives strong assurance that, in due time, it will return substantially to Judge Story's original policy.

In 1895 admission was restricted to 'graduates of approved colleges' and 'persons qualified to enter the Senior Class of Harvard College.' When the new rule took effect, eighty per cent of the student body were already college graduates. After 1897 only college graduates were admitted except as special students not candidates for a degree. After 1899 non-graduates were no longer admitted. Up to 1924 graduates of approved law schools, not college graduates, were admitted if not candidates for a degree. This category was cut off, and to-day a degree from a recognized college is a prerequisite of admission in any capacity. Moreover, since 1927, the applicant for admission must show a 'meritorious college record,' and in case of a graduate of a second-list college, must have ranked in the first quarter of his class.

In spite of this increasingly high requirement for admission, always ahead, not only of requirements for admission to the bar, but of prevailing law school admission requirements, the student body increased steadily. It numbered 154 in 1870, 200 in 1877, nearly 500 in 1897, over 850 in 1917, and 1534 in 1927. By that time the limit of the school's physical capacity had been reached. This, and desire to maintain the ratio of one teacher to sixty students, has compelled the turning away of many well-qualified applicants during the past two years. The need of restricting the first-year class to not more than seven hundred makes the problem of admission a difficult one, with which the School administration is still struggling.

Not only has the School throughout its history been national in its teaching of law, but its student body has been increasingly representative of the country as a whole. In 1824, 18 colleges were represented; in 1849, 41, in 1892, 54; in 1903, 111; in 1927, 203. The sectional distribution in 1926–27 was as follows: 361 students from New England, 425 from the Middle States, 162 from the South; 42 from the Southwest; 304 from the Middle West; 106 from the Rocky Mountain region and Pacific Coast. This proportion seems to be maintaining itself.

More important is the spirit of the student body: the unique enthusiasm for study. There is a long tradition behind it. Richard Henry Dana tells how Judge Story, after holding court in Boston until two o'clock, would be in the School at three on Saturday afternoon to hear moot arguments; and although the exercise was voluntary, everyone would be on hand, and the case would be heard until late in the evening. In Story's devotion to the work of the School is perhaps the germ of the atmosphere of study in the school of to-day, 'a phenomenon,' says a foreign observer, 'which has not its like in the most remote degree anywhere else in the world.'

When the United States entered the World War substantially every student applied for admission to some one of the officers' training camps. Nearly half of the student body were taken into these camps at once, and before the opening of the school year 1917–18 over two thirds of the student body were in service. Accordingly, the Faculty made special provisions for full-year credit to students in good standing who entered service before the end of the year. Only the few who were physically unequal to military service and unable to find other public employment were left as students. But the Faculty preserved the continuity of its work; and after the Armistice a special session was arranged, lasting until September, 1919, for those demobilized too late to enter the regular session. The work of teachers and students in this special session was especially earnest and thorough, and thus the continuity of the School's tradition remained unbroken.

6. The Library

When the School was organized, it spent $681 on books. From that modest beginning the library grew slowly by occasional donations, until in 1826 the published catalogue showed 587 titles. Story supplemented this inadequate list by selling the School at a nominal price his collection of 553 volumes of reports. By 1834 the collection had grown to over 3500 volumes. The same year, the bequest of Samuel Livermore, giving his entire library of Roman, Spanish, and French law, at the time the best in the country, laid the foundation of a collection of comparative law. By 1847 the Library had grown to 12,000 volumes. With Greenleaf's retirement came retrogression. Under Parsons and Parker and Washburn (1848–70) the Library was not kept up; students were employed as librarians, and many books were lost.

A new era began with Langdell. He meant the Library to be a laboratory. His method called for first-hand use of the sources by students. Hence the collection of reports must be complete, must be kept up, must be so administered as to be accessible. One of his first steps was the appointment of a permanent librarian, John Himes Arnold, to whom is due the present primacy of the Library among the law libraries of the world.

Arnold was born in Rhode Island in 1839. He had a normal school education, and taught school in Rhode Island and in Cambridge for fifteen years. In 1872 he was appointed Librarian of the Law School, and gave himself unsparingly to the upbuilding of the Library until his retirement in 1913. It tells little of his achievement to record the bare fact that the Library grew from 15,000 volumes to 150,000. He set out to make a complete collection of the legal materials of the English-speaking world, and, buying with sure judgment and searching for the books which he required in out-of-the-way places, at a time when there were few competitors in the field, was able to realize his ambition. What Dicey said in 1899, before Arnold's work was complete, tells something of the story:

> It constitutes the most perfect collection of the legal records of the English people to be found in any part of the English-speaking world. We possess nothing like it in England. In the library at Harvard you will find the works of every English and American writer on law; there stand not only all the American reports — and these include, as well as the reports of the Federal courts, reports from every one of the forty-five states of the Union — but also complete collections of our English reports, of our English statutes, and of the reports and statutes of England's colonies and possessions. Neither in London nor in Oxford, neither at the Privy Council nor at the Colonial office, can one find a complete collection, either of American or even, astounding as the fact sounds, of our Colonial reports.

Before Arnold's retirement, a great collection of International Law had been bought, and he was at work building up a library for Comparative Law. On his retirement he was succeeded by Edward Brinley Adams (A.B. 1892), under whom there was great progress in the collections of foreign legislation, treatises and periodicals, of international law, of Latin-American law, and on subjects related to criminal law. Mr. Adams died in 1922. His successor is Eldon R. James (S.J.D. 1912), whose policy has been to maintain a complete collection of the legal materials of the world. In 1928 there were 275,000 volumes and 55,000 pamphlets in the Library, and the School was spending $65,000 annually in the purchase of books.[1]

Since Langdell's time much attention has been paid to creating a common-law atmosphere. Through the efforts of Arnold a very complete collection of etchings, engravings, and photographs of English lawyers and judges was brought together and put on the walls of the lecture rooms. When Adams was librarian, he was at work upon a similar collection of American judges and lawyers. Since 1916 a collection of portraits of British judges and lawyers from the reign of Edward VI, by such artists as Van Somer, Kneller, Lely, Raeburn, Romney, and Lawrence, has been brought together; and a good beginning has been made on portraits of American colonial judges, by artists such as Smibert, Feke, Trumbull, and Stuart; of Justices of the Supreme Court of the United States, and judges of the state courts.

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[1] In 1881–82 a book fund of $47,000 was secured, to which was added in 1923 a second book fund of $100,000 out of surplus. In 1898 a general library fund of $97,000 was set apart, also out of surplus. These, with the funds provided by the bequest of Augusta Barnard (1914), now amounting to $101,827.08, the Cadwalader gift (1914) of $20,000, the Hemenway bequest of $50,000 (1928), the provision of the endowment of 1926 for bibliographical work ($100,000, to which the General Education Board added a like amount), and the amount given to the Library in the endowment of 1926, assure it an annual income of over $50,000.

7. Student Activities

A characteristic feature of the School is the strict, but chiefly self-imposed, limitation of student activities to things directly connected with professional training. The sole extra-curricular activities of the students are the Harvard Law Review, the Board of Student Advisers, the Legal Aid Bureau, the Law Club Supervisors, the Ames Competition, and the Law Society of Phillips Brooks House.

Founded by a group of students in 1886, the Harvard Law Review is substantially unique among legal periodicals in that the student editors have sole charge and are solely responsible. There are no faculty editors and there is no faculty supervision. It is now in its forty-second volume. It was the pioneer academic professional periodical in this country, and established a type. Law reviews and law journals on its model have sprung up throughout the land, and recently in England. To-day nearly every important law school maintains a periodical of the sort. Its board consists of thirty-one men, taken about equally from the third- and second-year classes, solely on the basis of scholarship.

Members of the Board of Student Advisers are also chosen solely on the basis of scholarship. Usually the fifteen men having highest rank in the second- and third-year classes respectively are on the Law Review; the eleven next highest in rank in the third-year class and the three next in rank in the second-year class, are upon the Board of Advisers; those next in point of rank are elected to the Legal Aid Bureau; and those who rank next are designated as Law Club Supervisors. There are now fourteen Advisers, eleven from the third-year class and three from the second-year class. It is their work, in addition to supervision of the Ames Competition, to explain to first-year students where to find books and how to use them, the scope and mode of use of digests and works of reference, and the mechanics of drawing briefs. Also they advise first-year students generally about the Library and books of which they ought to know. The Board prepares a pamphlet for the use of first-year students, covering the finding of authorities, the preparation of briefs, the presentation of arguments, and suggestions for general legal reading. This pamphlet has recently been copied by other law schools.

In a sense the Legal Aid Bureau had its inception in a group of students who began to do legal-aid work in the eighteen-nineties under the direction and at the instance of Professor Wambaugh. In 1912 coöperation began between the Harvard Law School and the Boston Legal Aid Society. In 1913 the Harvard Legal Aid Bureau was formally organized. At first it was one of the activities of the Law School Society of Phillips Brooks House. It is now a wholly independent organization. It consists of thirty members, partly from the third and partly from the second year, chosen on the basis of scholarship. The school supports the Bureau to the extent of an annual subvention to cover its ordinary expenses.

With the great increase in the size of the first-year class, it became necessary to organize each year a number of new law clubs. The Advisers help new students organize such clubs, and give them needed advice about how to go at law-club work. But new clubs do not have the advantage possessed by older clubs, which have a second- and third-year membership to put them in touch with our highly developed law-club tradition and guide them in their formative year. To meet this situation, for several years a certain number of third-year men, chosen on the basis of scholarship, are selected as Law Club Supervisors. One such supervisor is appointed to each new club. He attends its arguments, gives counsel in its organization and conduct, and does generally what a third-year president of an older law club would do for the first-year men in his club.

When the Ames Competition was established (1910), a fund left by Dean Ames, now yielding a little more than $600 a year, was expected to be appropriated to prizes in a competition between the different law clubs of the school, extending over three years. The club court system is an old one, which at the end of the last century had definitely superseded the old official moot arguments. Some years ago the oldest of the clubs, the Marshall, celebrated its one-hundredth anniversary. The clubs are purely voluntary organizations, devoted exclusively to arguments of moot cases. The established clubs, of which there are over fifty, keep up their membership from year to year, taking in regularly eight first-year students annually. Since 1920 a plan has been put into effect whereby any student who desires to do law-club work leaves his name with the Advisers, and the latter arrange new clubs by bringing together groups of eight out of those who turn in their names. Many clubs organized in this way become permanent, and the work done in them is usually quite as good as that done in the older and well-established clubs. Nearly all students take part in club arguments. The very few who do not are almost always students who are compelled to work on the outside to make their way, and hence cannot afford the time.

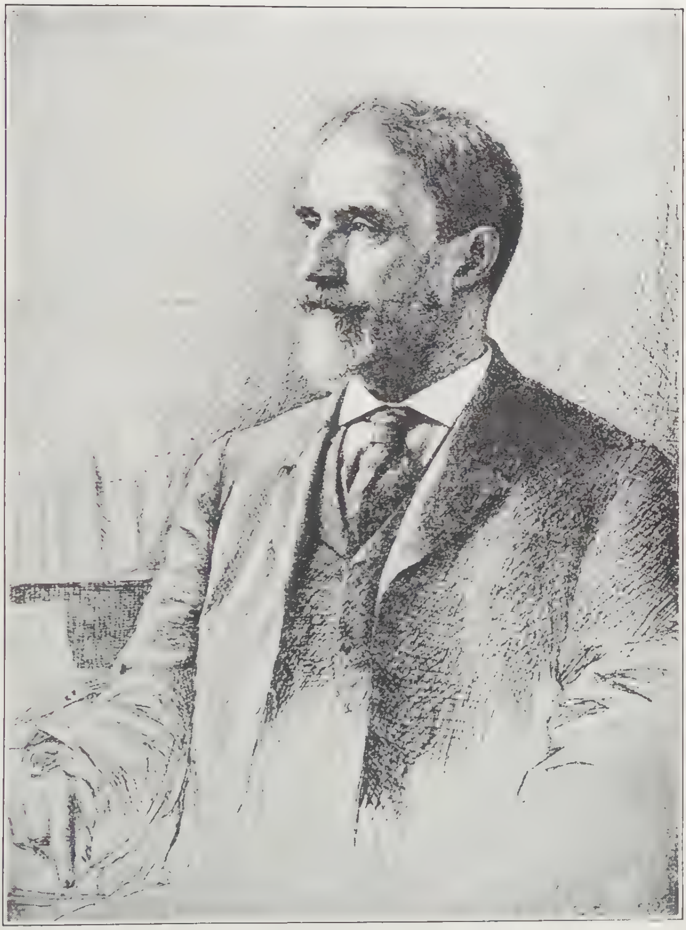
Down to 1910 the clubs did all their work within their organization. When the Ames Competition was first set up it was a competition in the second and third years between such clubs as entered for it in the second year. Since 1920 the competition has extended to the first year. In the third year the briefs and records are printed and judges of the highest courts, state and federal, are brought in to preside. The names of the winners are put upon a tablet in Langdell Hall, and at the end of ten years the temporary tablet is replaced by a bronze one.

A number of useful activities are carried on by the Phillips Brooks House Society. It maintains a loan library, provides a selected list of available rooms in private houses, holds a meeting for new students at the beginning of each year, which is valuable in enabling them to start upon their work intelligently, and from time to time brings leaders of the bar to the school for addresses.

Although these extra-curricular activities are voluntary, their quality is of a high order: a significant fact respecting the morale of the student body. The standing of the Law Review speaks for itself; but the work of the Board of Advisers and the Legal Aid Bureau and of the Ames Competition is no less thorough, and enlists quite as much time and energy.

8. ADMINISTRATION

Until 1870 no one was officially charged with the administration of the School. Regulations were made by the Corporation, even regulations for the use of the Library; and the Faculty had



JAMES BRADLEY THAYER

JAMES BARR AMES

power only to administer discipline and recommend candidates for degrees. The office of Dean was created in 1870. Under Langdell and Ames it became one of leadership in a Faculty to which the general conduct of the School was committed. Apparently there had been no Faculty meetings before 1870. After 1870 the Faculty met regularly, and Langdell's reforms were brought about through Faculty votes. From that time the Faculty was the immediate governing body, with the Dean as executive organ and educational leader. In the former function the Dean was assisted by the Librarian after 1872; but by 1896 the pressure of administrative work had become such as to absorb too much of the time which the Dean ought to have been giving to the educational side of his office. Moreover, the growth of the Library made it impossible for the Librarian, even with a competent and efficient assistant, to go on doing the work of secretary to the Dean. Accordingly, in 1896 a Secretary of the School was appointed, and administration of the details of admission, the keeping of records, and contact with students on matters other than questions of law were committed to him.

This simple organization of Dean, Librarian, and Secretary ceased to be adequate when the School grew to more than one thousand students; especially when the new admission requirements and the pressure of applicants made the function of admission something more than inspection of candidates' diplomas. Once more the Dean was swamped by routine administrative work, and at a time when he needed to give thorough study to the new problems of legal education. The Faculty, too, was overwhelmed by a mass of detail. To meet this condition, a new organization of the School administration was put in effect in 1928. Much of what had theretofore fallen upon the Dean and Faculty was turned over to an Administrative Board made up of a Vice Dean, a Chairman of Graduate Courses, chairmen of Third-Year, Second-Year, and First-Year Courses, and a Secretary of the Board. Student applications involving no more than administration of or dispensation from the rules now go to the Chairman concerned, are investigated by him, and on his report are passed on by the Administrative Board. The Board also recommends for Fellowships and Scholarships. Upon the Dean's initiative, it discusses and formulates changes in curriculum and methods of instruction, in advance of Faculty discussion and decision. The Vice Dean is responsible for student discipline, and with the chairmen advises students about their courses. The intention is that the Dean and the Faculty shall do what Eliot and Langdell conceived of as their function, while the routine of administration shall be the task of the Administrative Board.

9. Endowment and Buildings

From 1817 to 1830 the Royall Professor was on the budget of Harvard College, and the University Professor was paid from tuition fees. The Library depended on gifts. Other expenses were met apparently by the College budget, but charged to the School, so that at the end of Stearns's administration there was a deficit of over $2,000. In 1839 there was a surplus, which increased to $23,000 in 1844; and in 1845 Dane Hall was enlarged out of it. By 1856 the surplus had fallen to $16,000. A bad investment in that year dissipated it, and successive annual deficits created an indebtedness which, during the Civil War, grew to $6,000. From that time the financial management improved. There was a slight deficit in 1867, but there was only one under Langdell, — in 1877–78, — and none under Ames.

Of the gifts before Langdell, the Royall Fund, at the time of its transfer to the School (1829), amounted to less than $8,000; Dane's bequest was $10,000. Both funds are now much larger. The Bussey Professorship, established in 1862, now has a capital of $30,000. Under Langdell, the Bemis and the Weld chairs were endowed; under Ames, the Carter Professorship of General Jurisprudence; these three funds now average over $100,000 each. In order to provide for present salaries, the latest chair, the Fairchild Professorship of Comparative Law (1928), was endowed twice as heavily. The Byrne Professorship of Administrative Law (1920) comes between the two.

The apprentice type of law school, depending on fees and shaping its policies to the exigencies of the Bursar's Office, was given up a century ago, and has not existed since. Since Langdell's time, careful management and steadfast devotion of the revenue to the ends of legal education, have put the School on a firm financial basis. Since the war it has been possible to put by a surplus each year. The new endowment provided in 1926 by alumni, friends of the School, and the General Education Board, together with accumulated surplus, made it possible to complete Langdell Hall.

Under Story the School occupied a two-story wooden building with brick ends and gambrel roof, known as College House No. 2, or 'The Den,' standing just north of the present building of the Harvard Coöperative Society. The School had three rooms on the ground floor, used respectively as a lecture-room, a library, and the office of the University Professor. When Story came, Nathan Dane, who had already endowed the Dane Professorship, gave the money for the building dedicated September 24, 1832, as 'Dane Law College,' and occupied by the School for fifty years. This neo-classical brick temple with an Ionic portico, was much altered and enlarged in 1845, and when Matthews Hall was built (1871), was moved slightly to the southward, to the site of Lehman Hall.[1] In 1918 it was destroyed by fire. Edward Austin of Boston in 1882 gave the money, $135,000, for Austin Hall, designed by H. H. Richardson This was the home of the School until 1907, when the south wing of Langdell Hall was completed. After that, Austin was used for lecture-rooms, reading-rooms, library stacks, and the offices of the Harvard Law Review; while the main stacks, lecture-rooms, reading-rooms, and professorial and administrative offices, were in Langdell. Gannett House, an old frame dwelling formerly used as a dormitory, was fitted up and used for the offices of the Secretary, of the Harvard Law Review, of the Board of Student Advisers, and for the Legal Aid Bureau, in 1925; and the next year Kendall House, a frame dwelling on Massachusetts Avenue, was purchased and fitted up for faculty rooms, graduate seminar rooms, and other purposes. Work began in 1928 on the completion of Langdell Hall, which is planned to give the School complete facilities for as long a time as can be foreseen.

[1] Pictures of Dane Hall before the enlargement and after the removal are in *The Harvard Book*, i (1875), 223.

XXXI. THE BUSSEY INSTITUTION

1871–1929

By William Morton Wheeler, Ph.D.
Professor of Economic Entomology and *Dean of the Institution*

THE history of the Bussey Institution falls naturally into two periods, the first extending from its inception in 1871 to 1908, when it was an undergraduate school of husbandry and gardening, the second comprising the period of its service since 1908 as a graduate school of applied biology. The Institution was established as a department in Harvard University under the trust created by the will of Benjamin Bussey. This will, drawn in 1835, provided for a school of agriculture and horticulture. It anticipated by more than twenty-five years the Morrill Act of Congress, establishing the state agricultural colleges, and was remarkable for its foresight of one of the most important educational and scientific developments in the country. In addition to the endowment, Mr. Bussey left the University three hundred and ninety-four acres, a beautiful tract of land in the Jamaica Plain Forest Hills section of West Roxbury, within the present city limits of Boston. A further generous endowment from James Arnold in 1872 enabled the University to develop some two hundred and twenty acres of this land as one of the great arboretums of the world.[1]

The last Report of President Hill, for 1867–68, indicates that for some time the Corporation had been seriously considering the establishment of the Bussey Institution. The President declares that

> there seems to him nothing in the will of the founder which should prevent the Institution from being an Agricultural College of the highest class, not educating farmers' sons in a knowledge of their fathers' trade . . . but an institution recognizing the high and difficult character of the art of husbandry, which lays all the mechanical, chemical, and physical sciences, including botany and zoölogy, and even comparative psychology, under contribution, in order to learn how best to

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[1] Further particulars respecting many of the individuals and allied departments of the University mentioned in this chapter will be found in the chapter on Botany, by Professor Robinson.

cultivate and improve plants and animals. Such a college should exist in this country, and it can only exist in close connection with a university richly endowed with chairs of pure science.

The actual organization of the Institution was begun during the first year of President Eliot's administration (1869–70). Mrs. Thomas Motley, Mr. Bussey's daughter, who had a life interest in the estate, released about seven acres (the 'Plain Field'), which her father had designated as the site of the school building. Her husband was appointed in 1870 Instructor in Farming, and Francis H. Storer (S.B. 1855), well known as the author of valuable textbooks on chemistry,[1] was appointed Professor of Agricultural Chemistry. By this time the building fund, which had accumulated during twenty-seven years, amounted to $75,000, of which $45,000 was set aside for a building. The contract for its erection was let during 1870. A three-year programme of instruction, the first year to be given at the Lawrence Scientific School in Cambridge, was discussed and matured during the spring of 1871. The second-year subjects, given at Jamaica Plain, were farming, horticulture, agricultural chemistry, quantitative analysis, applied zoölogy, and entomology. Women were to be permitted to enter the courses in horticulture, agricultural chemistry, and entomology. In the case of poor but meritorious students, the tuition fees were to be remitted, in obedience to a provision in Mr. Bussey's will. President Eliot states that 'the single object of the School is to promote and diffuse a thorough knowledge of Agriculture and Horticulture.'

The main stone building of the Institution was completed and partially furnished during the academic year 1871–72, and instruction was begun with a faculty consisting of Dean Storer; Francis Parkman (A.B. 1844), Professor of Horticulture; Thomas Motley, Instructor in Farming; Daniel Denison Slade (A.B. 1844), Professor of Applied Zoölogy; Francis G. Sanborn, Instructor in Entomology. Twenty-two students enrolled, but none as yet wished to pursue the regular three years' course. In September, 1871, greenhouses were built under the direction of Professor Parkman. This was the famous historian, whose connection with the Institution was of brief duration, since he resigned in May, 1872. He had always been interested in horticulture. John Fiske states that 'he was a horticulturist of profound attainments, and himself originated several new varieties of flowers. His work in this department made him an enthusiastic adherent of the views of Darwin.' The second volume of the Bulletin of the Bussey Institution contains an interesting article by Parkman entitled 'The Hybridization of Lilies,' the results of experiments extending over ten or twelve years.

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[1] *A Cyclopaedia of Quantitative Chemical Analysis* (1870); *Agriculture in some of its Relations with Chemistry.* The seventh edition of this work was published in 1903.

The loss — owing to the great Boston fire of November 9–10, 1872 — of income derived from store rents in the city was serious but temporary. Although both the Chair of Horticulture and the Instructorship in Entomology were permitted to lapse, there was again a favorable pecuniary balance during 1873–74. In April, 1874, Mrs. Motley conveyed all her interest in the Bussey estate to the University authorities. One hundred and thirty-seven acres of it were then set apart as the Arnold Arboretum, and Charles L. Sargent was appointed its director. The Bulletin of the Bussey Institution was established, and a portion of its first volume published.

The academic years 1874 to 1876 were a period of considerable activity in research on the part of the Bussey staff. Professor William G. Farlow began his work at the Institution and contributed to the Bulletin several important and beautifully illustrated memoirs on injurious fungi; Dean Storer completed a number of valuable investigations in agricultural chemistry. This research work was supported in part by funds contributed by the Massachusetts Society for the Promotion of Agriculture. The insistence on investigation is evident in Dean Storer's report for 1874–75, and his opinion of the activities of the students is clear from the following remarks:

> It would, of course, be mere folly for the University to expend its resources in teaching, or trying to teach, a thing which can be learned to better advantage upon almost any farm. But the fact that so many men regard manual labor as a part of a College Course is none the less interesting, since it marks a phase of opinion which is distinctly inimical to the success of our agricultural teachings. Until this opinion has been outgrown, as it has been in several other countries, we can hardly look for any very rapid progress in scientific agriculture in America.

In his Report for 1876–77 President Eliot reviewed the financial situation of the Bussey and pointed out that its income had dropped from $17,674.98 in 1873–74 to $8,902.98 in 1876–77, as a result of a serious fall in the rental values of the Bussey stores in Boston. The Corporation had therefore organized the Institution upon a scale of permanent annual expenditure of $14,000 to $15,000. Dean Storer reports, however, that the instruction had much improved and that Professor G. L. Goodale and Benjamin M. Watson (A.B. 1870) had been added to the staff, the former in phanerogamic botany, the latter in horticulture, a subject which had been discontinued on Professor Parkman's resignation in 1872. The decline in the finances continued during 1877–78, so that the Institution showed a deficit of $3,615.73. The number of students was still small, being only eight, as compared with five in the preceding year. The faculty now consisted of Storer, Motley, Slade, Goodale, Farlow, and Watson. The Bulletin had to be discontinued owing to lack of funds.

In 1879 President Eliot announced that the Bussey was slowly gaining, that its staff had never been so strong, or its pecuniary condition so bad. The funds had fallen to $5,113.35 and the income for 1879–80 was estimated at $4,000 — it turned out to be only $3,505.30. Yet in 1879, Edward Burgess (A.B. 1871), the well-known yacht designer, was appointed Instructor in Entomology; Lester S. Ford (B.A.S. 1879), Demonstrator in Anatomy; and Charles E. Faxon (S.B. 1867), Instructor in Botany. Ford and Watson received very small salaries from private sources; Faxon and Burgess served without remuneration. The President comments on the danger 'of attempting to support permanent charges upon an income derived from local investments all of one kind, and also on the extreme imprudence of the testator who undertakes to dictate the investments in which his money shall be placed through all time, or even through so short a period as forty years.' The Arboretum fund of $150,000 was completed during this year (1878–79). President Eliot stated: 'During the past seven years the Arboretum has received large pecuniary support in various ways from the Bussey Institution, of which it is a department; but the diminished resources of the Institution made the continuance of that support impossible.' Sargent was therefore appointed Professor of Arboriculture, on a salary derived wholly from the Arnold Fund, and the greenhouses, hitherto occupied by him, were released to the Bussey. The Arboretum had been laid out as a park and museum by F. L. Olmsted during the preceding year. Dean Storer regarded as the most noteworthy event of the year 1878–79 the graduation of the first Bachelor of Agricultural Science — Lester S. Ford. Goodale and Farlow moved to Cambridge.

In spite of its distinguished faculty and ample facilities for instruction in scientific agriculture, the story of the Bussey from 1880 to 1895 is depressing. The annual enrolment of students was never higher than sixteen, and the average eight. Only ten degrees were granted.[1] Dean Storer attributed the lack of growth to the founding of the Harvard Veterinary School, which attracted students interested in animal husbandry, and to the abundantly advertised free scholarships in the Massachusetts Agricultural College at Amherst, and in other land-grant colleges. In 1879–80, after paying the farm instructor, there was left a net income of $505.30! Faxon and Burgess continued to give their services; the rest of the staff received, from private subscriptions, salaries varying from $250 to $600. This devotion could not continue without support or patronage, and by 1888 the faculty had shrunk to four: Storer, Watson, Motley, and Nathaniel Thayer Kidder (B.A.S. 1882). Only by income from the farm (boarding horses and cattle and raising vegetables for Memorial Hall) was the Institution able to carry on. It was a severe blow when the Corporation transferred to the Arnold Arboretum a large piece of the Bussey land which had earned over seven hundred dollars annually for the Institution.

More Bussey land was sold in 1898–99; yet Dean Storer reported that year as one of unprecedented prosperity: 'It may now safely be admitted that the School has struck root and has acquired strength to maintain vigorous and continuous growth.' It was, however, cramped for space, on account of the occupation of important laboratory space in the stone building by the State Board of Health. This came about by an arrangement made in 1895, by virtue of which Dr. Theobald Smith, appointed to the long vacant Chair of Applied Zoölogy, was supported in part by the State Board in return for producing vaccine and diphtheria antitoxin for their use. Dr. Smith and his family occupied the Bussey mansion. He planned the present

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[1] These included, however, Kenelm Winslow (1883), one of the leading veterinarians in the country, and Ralph S. Hosmer (1894), Professor of Forestry at Cornell and the New York Agricultural College.

Antitoxin Laboratory, which was erected in 1902–03 near the Bussey building, and has recently been enlarged and renovated by its present director, Dr. Benjamin White.

There was a slow but irregular increase in the number of students between 1896 and 1907, when a total enrolment of forty-four was attained. New instructors were appointed, including Mr. John G. Jack, who has been serving the Institution and the Arboretum ever since; and new greenhouses were built. At Commencement, 1907, six graduates received the B.A.S. degree But that Commencement marked the end of the old Bussey, as administered by Dean Storer.

For a year the reorganization of the Institution had been under almost continuous discussion. In March, 1907, the governing boards of the University decided

> to transform it from an undergraduate school of agriculture into an institution for advanced instruction and research in the scientific problems that relate and contribute to practical agriculture and horticulture. It thus became one of the component parts of the Graduate School of Applied Science. The four fields of work chosen for immediate development were Economic Entomology, Animal Heredity, Experimental Plant Morphology, and Comparative Pathology. . . . Professor W. M. Wheeler was called from the Natural History Museum in New York to take charge of this work.[1]

The Bussey Institution, then, entered a new period of its history in 1908, as a Graduate School of Applied Biology, a descriptive subtitle which has been used officially since 1915, when, owing to the reorganization of the Graduate School of Applied Science,[2] the Bussey staff was organized as an independent faculty, of which I have since acted as the Dean. After the last undergraduate enrolled in the old Bussey had taken his B.A.S., in 1910, only graduate degrees — Masters of Forestry, Masters and Doctors of Science in appropriate subjects — have been conferred under the Bussey.

Soon after I entered on my duties in the fall of 1908, Professor

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[1] President's *Report* for 1906–07, p. 151. Dr. Wheeler is the author of numerous scientific papers on embryology, cytology, and the taxonomy and behavior of insects, notably of the Ants, on which he is the principal American authority; of *Ants, their Structure, Development and Behavior* (1910); *Social Life among the Insects* (1923); *Emergent Evolution and the Development of Societies* (1928); *Foibles of Insects and Men* (1928); *The Social Insects, their Origin and Evolution* (1928). — S. E. M.

[2] See Dean Hughes's chapter on Engineering, above.

William E. Castle (A.B. 1893)[1] transferred his laboratory to the Institution, and has since continued his researches in animal genetics in the same quarters. Dr. Edward M. East[2] was appointed to the Chair of Experimental Plant Morphology (plant genetics), and Mr. Charles T. Brues[3] was appointed Instructor in Economic Entomology in 1909. Through the efforts of Mr. John Lowell (A.B. 1877), $5525 was obtained for the reorganization of the work in genetics. There was only one student during the first academic year, nine in 1912–13.

The scope of the Institution was enlarged in the fall of 1914 by including the work in plant anatomy in charge of Professor Irving W. Bailey (A.B. 1907) and the Department of Forestry with the Harvard Forest at Petersham, under the management of Professor Richard T. Fisher (A.B. 1898). Courses in forestry had been offered in the Lawrence Scientific School since 1902.

The Harvard Forest at Petersham, Massachusetts, the oldest demonstration tract and research laboratory in the United States, was presented to the University in 1907 in part by the previous owner, James S. Brooks, but chiefly by John S. Ames (A.B. 1901, M.F. 1910) of North Easton. Gifts of abutting owners simplified the boundaries, secured the approaches, and rounded out the area to an aggregate of about 2100 acres.[4] The terrain of the Harvard Forest is New England upland, typical in a soil of fine sandy loam, a wide variety of slope and exposure, ponds, and marsh, and two miles of river valley, with examples of the more xerophytic development of gravel ridges and small sand plains. The composition of the Forest exemplifies in the species an interesting overlap between types characteristic of the north woods and those prevailing in southern New England and the Middle States. It includes practically every phase of forest succession which has occurred in central New England, from remnants of the primaeval forest to the large variety of types which have followed cutting or the abandonment of fields, or of lands not cleared for agriculture. From the start the Forest has been under the management of Professor Richard T. Fisher as Director, and the staff, originally limited to Professor Jack and himself, has been increased by two instructors and an assistant at Petersham.

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[1] Author of *Genetics and Eugenics* (1916) and important experiments on heredity in guinea pigs and rabbits.

[2] Author of *Inbreeding and Outbreeding* (1919), *Heredity and Human Affairs* (1927), *Mankind at the Crossroads* (1923).

[3] Author of *Insects and Human Welfare* (1920); co-author of a *Key to the Families of Insects* (1915).

[4] In addition, the Forest manages an adjoining tract of 250 acres belonging to the New England Box Company, on which joint experimental work is carried out; and it has been given a 20-acre tract of virgin white pine and hemlock in Winchester, New Hampshire, to be forever maintained in its natural state.

The Forest has three principal functions: (1) As a model forest to demonstrate the practice of forestry. It is the first organized forest in the United States where all the slow processes of silviculture are in successful operation, and where a regular yield in lumber is available without depletion of the forest capital.[1] (2) As an experiment station for research in forestry. In this function the Forest, through research and the practical problems of twenty years' operation, has developed a workable system of handling the regional forest types. (3) As a field laboratory for students. A forest is as essential for the training of a forester as a hospital for that of a doctor, and the longer a forest has been under management, the more instructive it is to the professional student. The students in forestry at the Bussey spend most or all the academic year at Petersham, according to the need of the particular clinical or applied phase that they are studying; and all may obtain practical experience in operating a forest property. Since 1908, one doctor's and thirty master's degrees in Forestry have been granted under the Bussey Institution to students trained at the Forest. In the meantime, the staff is actively engaged in research, not only in applied forestry, but also in the fundamental factors, from which knowledge is being increased or practice confirmed.

Professor Oakes Ames brought economic botany into the work of the Bussey in 1915–16 and maintained his laboratory there till 1926, when he moved to Cambridge as Curator of the Botanical Museum, though his research work remains an important component of the Institution's programme. Moreover, after the death of Sargent in March, 1927, and the appointment of Ames as supervisor of the Arboretum, the relations between these institutions, which had been rather distant since

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[1] The initial stand of saw timber was estimated to be 10,500,000 feet, with a current increment of 250,000 board feet. In twenty years approximately 4,000,000 board feet have been cut. Cut-over areas have been satisfactorily reproduced, and the total amount of productive land increased by over two hundred acres. In 1928 the merchantable growing stock stood at approximately 12,000,000 board feet, and the annual increment at 400,000 board feet, which is the amount of the present annual cut. See R. T. Fisher, *The Management of the Harvard Forest* (1921).

1879, have become very cordial and intimately coöperative. During 1928–29 Professor Karl Sax (S.M. BOT. 1917) and Professor Joseph H. Faull (PH.D. 1904), the former in Cytology, the latter in Plant Pathology, have been added to the Arboretum and Bussey staffs.

During the past five years the Bussey Institution, the Arnold Arboretum, and the Museum of Comparative Zoölogy have coöperated in administering the Harvard Tropical Laboratory and Botanical Garden at Soledad, Cuba.[1] This institution provides greatly increased facilities for research, since it enables the students and members of the Faculty to extend their investigations to the flora and fauna of the Neotropical Region and thus to supplement the work at the Bussey, the Arboretum, and the Harvard Forest. Owing partly to these added facilities, the number of students has increased at the Bussey Institution. On the average twenty-four have registered for research each year during the past half-decade. It is now difficult to find adequate space for additional investigators in the old stone building.

Since the reorganization of the Bussey as a graduate school, its staff and students have published a great number of contributions to the biological sciences. Although the activities of the Institution are concentrated on research, there has been no time during the past twenty years when some of the members of the staff were not giving general or elementary courses to graduate and mature undergraduate students in coöperation with the Zoölogical and Botanical Departments in Cambridge. Of the students who have completed research work at the Bussey, sixty-seven have received the degree of Master of Science and sixty-three the Doctorate of Science in Applied Biology. Nearly all these graduates are continuing their biological investigations in widely scattered parts of the world. Most of them hold important positions at various universities, federal bureaus, or agricultural stations in the United States, but a considerable number hold or have held similar positions in Canada, Japan, China, the Philippines, Hawaii, Samoa, Trinidad, Egypt, England, Denmark, and Germany.

It will be seen that the old Bussey, which for so many years under Dean Storer struggled on with insufficient endowment and was soon surpassed by the establishment of so many adequately endowed agricultural colleges throughout the country, has nevertheless given rise to three flourishing and highly serviceable establishments: the Arnold Arboretum, the Antitoxin Laboratory of the State Board of Health, and the new Institute of Biology. The first two and the Veterinary School really began as offspring of the old Bussey. They undoubtedly cramped and enfeebled the mother organism, because they lived on her limited resources during their infancy, and during the years of their independence yielded her no support, if, indeed, they were not actually indifferent or hostile. From its inception the new Bussey has pursued a different policy, which might be called one of symbiosis. It has constantly endeavored to draw to itself all the other departments of the University that are even remotely interested in the applications of biology, and to hold fast to them in vital coöperation and friendship. This policy was difficult or impossible for the old Bussey, because during its day the important bearing of biology on human welfare (apart from medicine), and the intimate interrelationship and interdependence of the various applied and pure sciences, were very imperfectly appreciated. The new Institution has succeeded, not only because the University and the public during the present century have become acutely conscious of the immense economic value of all the sciences, but because the whole biological faculty of the University has developed a more coöperative spirit.

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[1] See concluding section of the chapter on Botany, above.

XXXII. THE GRADUATE SCHOOL OF EDUCATION

1891–1929

By Henry W. Holmes, Litt.D.
Professor of Education and *Dean of the School*

IN 1891 Paul Henry Hanus was appointed as Assistant Professor of the History and Art of Teaching at Harvard. In 1906 a Division of Education was established within the Faculty of Arts and Sciences. In 1920 the Graduate School of Education became a separate Department; and in 1927 the School adopted a new programme of study, unique in its field. This brief chronology covers the major events in the history of the study of education at Harvard.

1. The Teaching of Education under the Faculty of Arts and Sciences, 1891–1920

The University has always nurtured teachers. For two centuries the schools and colleges of New England were very largely manned by her bachelors and masters; and her graduates, with those of Yale, Brown, and Dartmouth, carried Puritan ideals of education into the West. The preparation of teachers was one of the reasons for the introduction of summer courses in 1874 and of graduate degrees in 1872.[1] But Harvard's influence upon education during this long period was exerted under a conception obviously limited. Teachers were equipped with knowledge of their subjects, but the University had no department for the study of education as a whole. Until Professor Hanus began his labors, no student could obtain at Harvard an historical perspective of educational institutions, an understanding of the social functions of the schools, a command of teaching in the light of the facts of individual growth and learning, or an insight into educational policy.

The appointment of Hanus implied, therefore, a permanent change of attitude. The University assumed a new responsibility, which it has not since relinquished or denied; and it is easy to see, in retrospect, that the development in this field has been responsive to an insistent social need. By 1890, the schools of the country had long been recognized as an important instrument, hardly as yet under any constant or intelligent control, for working out the destinies of democratic life in America. The principles laid down in the Massachusetts laws of 1642 and 1647 were fixed in the educational foundations of almost every state in the Union; but the conflicts and changes of the nineteenth century had raised many difficulties in their application. The time had come to study the meaning of education in the light of history, to bring to bear upon its problems wisdom garnered from sciences and philosophies both old and new. It was no whim of President Eliot's that led to the teaching of education at Harvard, but a sense of the trend of the times.

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[1] Note also, on page 453 above, the two courses of 1869–70, to which women teachers were admitted. — S.E.M.

The first move in this direction was made, indeed, ten years before the appointment of Professor Hanus. In 1881, G. Stanley Hall, later President of Clark University, gave, at the invitation of President Eliot, twelve public lectures on pedagogical subjects, and served for three years as University Lecturer on Pedagogy. His lectures, delivered in Boston, were well attended, but did not lead to any further development. President Eliot confessed himself sceptical of 'pedagogical science' and of the application of modern German philosophy to American school-keeping, which was the trend of Hall's thinking.

It was pressure from without which finally led to the offering of a programme of 'Courses of Instruction in Teaching.' A Committee on a Normal Course for Graduates, of which Professor Royce was chairman, had been established by direction of the Faculty under a vote of October 7, 1890. This move toward a 'Normal Course' was made in response to the presentation by the President of 'the demands of those who sought legislative action from the General Court in 1889-90 in favor of such a project.' The plan recommended by the Committee contemplated a graduate department, admitting women, but not offering degrees. Accordingly, Hanus was informed on his appointment that he was to be 'the general agent for the Normal Department.' Events, however, took a different turn, and the courses in Education were soon incorporated into the offering of the Faculty of Arts and Sciences.

Hanus was not the first university professor of education in this country. Thomas H. Gallaudet was Professor of the Philosophy of Education in New York University in 1832-33. Permanent chairs of education were established before 1891 in the University of Iowa (1873) and in the University of Michigan (1879). The normal school movement was already half a century old; and it was at the State Normal School of Colorado that Hanus was Professor of Pedagogy when President Eliot called him to Harvard. The development of university departments of education was nevertheless wholly in the future, and Hanus was for years a pioneer. He was at first a lonely figure, doing his work single-handed, without accumulated aids, and without professional fellowship.

During the entire period covered by this account there was, however, an extraordinary expansion in university work in education. No other period in history, no other country in the world, can show such activity in professional training for teaching and school administration. After Teachers College had become a part of Columbia University in 1898, departments of education were established everywhere. Graduate study became the necessary guaranty of professional ability in school administration, normal-school teaching, and the teaching of education in colleges. Normal schools themselves developed into degree-granting institutions. Schools began to make the appointment and promotion of teachers dependent on professional study, and summer schools and extension courses were flooded with pupils, many of whom became candidates for advanced professional degrees. Books were issued rapidly, not only in such standard fields as the history of education and school administration, but in new ones, such as educational measurement. Established conceptions of the aims of school work were challenged, new principles were advanced, and there was a ferment of thought and action in every phase of education. The great foundations sponsored surveys and studies of national scope; states, cities, towns, and schools turned to professional students for advice and guidance.

Hanus and his colleagues at Harvard played their part in this development; and James E. Russell at Teachers College, Charles H. Judd at Chicago, Ellwood P. Cubberley at Stanford, and others elsewhere, gathered about them scholars in the subject. The time was ripe for their efforts, both because civilization had been carried to a stage which gave education a new importance and because the United States was entering with enormous resources and great vitality upon a period of conscious effort to master the factors in its common life. There was no avoiding the pressure to make the schools a more effective agency for social control and social advance. Furthermore, under a similar pressure of persons and events, the sciences contributory to education had been brought to a more fruitful condition. William James had remade psychology; sociology had begun to find itself; economics, government, and anthropology moved forward; statistical procedure came into use in all the social sciences. Meanwhile the whole pace of life was quickened by new inventions and new economic organizations and methods. Governmental activities multiplied; professional and philanthropic organizations for the study and furtherance of education increased; and prosperity brought continued additions to school and college enrolments, with consequent new problems and new demands. It was natural during such a time that the study of education should make rapid strides.

Hanus began his instruction with courses on the History of Teaching and Educational Theories, the Theory of Teaching, and the Art of Teaching, adding in the second year a course on the Organization and Management of Public Schools and Academies. Instructors in other departments of the Faculty offered for a year or two an ambitious array of courses in methods appropriate to the teaching of particular subjects, a few of which were continued. James and Royce delivered in the early years certain lectures on topics in psychology of interest to teachers. Much of this was in accordance with a report of the Committee on Courses of Instruction in Teaching, as adopted by the Faculty on December 16, 1890. Later, attention was given to contemporary educational conditions in other countries, and from the beginning a seminary was maintained for the study of special problems by more advanced students.

Training for superintendents of schools soon became an important element in the offering. In the course of time, as other teachers were brought in to assist Professor Hanus, courses were added which dealt with the work of the elementary school and of the secondary school. The theory of education was divided for treatment into its psychological, philosophical, and sociological aspects. Vocational education and guidance, and play and recreation, as special phases of education, were added to the topics dealt with in the programme, and the theory and application of statistics and measurement were included.

It would be uninteresting to trace in detail the elaboration of this array of courses. The evolution of the first offering into the present programme of the Graduate School of Education has been continuous, in spite of delays and difficulties. It should be noted, however, that the aim has always been that of a professional school. The courses in education have never been treated as if the learning of their content, without reference to its application, were the end in view. The object has been to offer professional preparation as adequate as circumstances permitted to prospective teachers and school officers. This implied, of course, a constant effort to increase by constructive study the knowledge and insight available for application to the work of schools.

The courses offered in 1891–92 were not listed in any department, but were called Courses for Teachers. In the next year (1892–93) they were listed as courses in philosophy. In the first year they were not given credit toward any degree, which indicates the suspicion and hostility of the academic mind of the nineties toward the teaching of education. As Professor Palmer said to the writer in 1907, 'When Professor Hanus came to Harvard he bore the onus of his subject.' It was a personal tribute to a colleague that Palmer added: 'But now there is no one whose voice in the Faculty is listened to with more respect.' By long and difficult effort Hanus finally won such recognition for the courses in education that they were established (1906) as a division of the Faculty of Arts and Sciences. For six years he worked entirely alone. In 1897 George H. Locke[1] was brought in to help him and remained for two years. He was succeeded by Arthur O. Norton (A.B. 1898).[2] Henry W. Holmes (A.B. 1903) joined the staff as Instructor in 1907, becoming Chairman of the Division in 1911, and Dean of the School on its establishment. After 1907, additions to the staff were part of the movement from organization as a division to organization as a graduate faculty. It is, however, the story of the years from 1891 to 1906 that records the gradual and reluctant recognition of education as a subject of instruction in the University.

The root of the difficulty encountered in those earlier years may be found in failure to perceive a decisive distinction.

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[1] Since Dean of the College of Education at Chicago and of the Teachers College at McGill, and City Librarian at Toronto.

[2] Professor of Education at Wellesley since 1912, and Lecturer on the History of Education at Harvard since 1919.

'Teaching teachers how to teach' is a minor and relatively simple part of university work in education, whereas the study of educational policy, based on individual development and the demands of social organization and social progress, is both important and difficult. Many university professors, regarding school curricula as fixed and unalterable, saw nothing in the study of education but a peddling of classroom devices. They did not even recognize the possibility of deriving principles of teaching from a study of the processes of learning. Still less did they conceive the schools as social agencies, affecting and affected by the economic, political, and cultural changes that go on about them. They did not see that university graduates in education must know the history of the schools, their opportunities, their resources, and their outlook. For this larger view of the work, Hanus and his colleagues argued year after year, and the logic of events was on their side.

Hanus saw at once that he must enlist the interest of teachers and school officials. At the suggestion of Professor Shaler, he organized the Harvard Teachers' Association in 1891, and was for years its secretary. This Association is still in active existence. It is probably the oldest association of its special character in this country, perhaps in any country, and it has done much to bring before the University and the public the more important educational issues.

To keep the instruction close to the schools has been a chief concern of the staff from the beginning. One means toward this end has been actual practice in teaching, in the public schools of nearby towns. This apprentice teaching grew out of a course on Methods of Teaching Science (Philosophy 19), in which 'persons engaged in teaching science in elementary and secondary schools' were associated with Hanus in the instruction. Opportunity for practice in schools was first announced in 1902–03. The difficulties in conducting such work in schools not under the control of the University are more than outweighed by the advantage of introductory practice in a regular school environment. Since the adoption of the present programme of instruction in 1927, this arrangement has been rendered more effective under a new apprenticeship requirement for the degree of Master of Education.

The staff itself has had varied and instructive contact with schools through educational surveys. Hanus's investigation of the schools of New York City in 1911–12, a task of great scope and great difficulty, was one of the first of the modern city surveys, and one which set many precedents and had many consequences. In 1906 Hanus became Chairman of the newly created Massachusetts State Commission on Industrial Education, the work of which bore fruit not only in the field of its direct interest but in the organization of the Department of Education of the Commonwealth. From 1909 to 1919 Hanus was himself a member of the State Board of Education. Other members of the staff, especially Inglis, have taken part in the work of commissions charged with the solution of school problems of the most varying character. The list ranges from surveys of single schools, public or private, to surveys of school systems in towns and cities, and to educational investigations covering all the public educational institutions of a state. Many of these surveys have been published, some of them by the School.

Keeping near to the schools might easily have brought absorption in problems of mere technique or in local and temporary conditions. A university school of education must also deal with educational problems in a universal spirit. This implies the statement of such problems in their most general terms, the discovery and organization of facts that bear on them, and the definition of principles under which they may be solved or reconceived. In education, as perhaps in other fields, the term 'research' has often meant something less than this. It is possible that the instructors in education at Harvard, and their doctoral students also, might have produced a greater 'output of research' if they had not been so much concerned to give to their constructive work a comprehensive character. Among the writings of the staff itself, Hanus's Educational Aims and Educational Values may be said to have set the fashion of dealing with fundamental issues. Dr. Ernest C. Moore, a member of the staff from 1913 to 1917, when he left to become Director of the Southern Branch of the University of California, published in 1915 a volume of wide influence, entitled What is Education? In 1918 appeared Inglis's Principles of Secondary Education, one of the earlier books on secondary schools to deal with the whole range of their problems from a single point of view. It became at once the leading textbook in its field and is still in wide use. These are especially significant instances of influential publications by members of the staff. The latest volume is in the same tradition: Dearborn's Intelligence Tests, Their Significance for School and Society.

Meanwhile the Division established, and the School later carried forward, several series of publications. The Harvard Studies in Education began with The Oberlehrer, a study of the social and professional evolution of the German schoolmaster, by William Setchel Learned, who was awarded in 1912 the second Harvard Ph.D. in Education. The Studies number, in 1929, eleven volumes, mostly doctoral theses dealing with topics of some scope. The Harvard Bulletins in Education, dealing with somewhat less general topics, have run to thirteen volumes; the Harvard Monographs in Education, chiefly in the field of measurement, now number nine volumes. In addition, the staff and students have produced a series of standardized tests, which are published by Ginn and Company. The School has also established a series called Documents in the History of Education and the series of Surveys alluded to above. It has continued the publications originally issued by the Bureau of Vocational Guidance, and the Inglis Lectures on Secondary Education. The Committee on Publications, under its Chairman, C. S. Thomas, now has charge of all the work published by or for the School. This administrative unification of publications has proved valuable, not only as a stimulus to production on the part of students and instructors, but as a means of perpetuating a recognized standard in the published work which bears the name of the School.

In 1917 the Bureau of Vocational Guidance was established as an administrative unit of the Division of Education for service as a centre of information and research in its special field. It took over the work of the Vocation Bureau of Boston, and was organized at Harvard through the generosity of the chief patron of that Bureau, Mr. A. Lincoln Filene, a member of the Overseers' Visiting Committee to the Division and the School. The Bureau has produced studies of occupations, many of them by Mr. Frederick J. Allen, and of the processes and problems of guidance in schools. Dr. John M. Brewer (A.M. 1915), since 1919 the Director of the Bureau, has been instrumental in forwarding the movement for vocational guidance locally and nationally. The Bureau publishes a magazine for the National Vocational Guidance Association.

The development of the Library began in 1891, when Hanus began to gather treatises and texts on education, and also school reports, documents, and journals. In spite of opposition, he also established a collection of textbooks contributed by the publishers for examination by students. The Library now occupies one floor of Lawrence Hall. On the establishment of the School as a graduate department, a generous gift from Mr. C. H. Hubbard was assigned to its uses. It is a strictly working collection, all material not in active use being transferred periodically to the Widener Building. The collections on education in the College Library, especially the historical material, are very large and of exceptional merit. The School has contributed in recent years to the reorganization and extension of these collections, aided by gifts from Dr. C. H. Thurber and Mr. George A. Plimpton and by the interest and devotion of T. Franklin Currier, Assistant Librarian. The School hopes eventually to have an adequate library building of its own.

The first Summer School course in Education was given by Professor Hanus in 1892; since 1897 the programme has continuously expanded, until in 1928 the courses in education numbered forty-seven, with five Demonstration Classes. Since 1921 the Harvard Summer School has been conducted under the joint auspices of the Faculty of Arts and Sciences and the Faculty of Education.

Under the Faculty of Arts and Sciences the teaching of education moved forward, on the whole, in a conservative spirit. The Harvard staff had part in the development of new methods of study in education, especially in the movement for intelligence testing and standardized measures of school achievement. It conducted many educational surveys. It contributed to the reorganization of secondary education and the establishment of the junior high school. It helped in the restatement of educational aims and the discovery of the principles of mental development and of learning, in the revision of curricula and of materials for teaching in the several school subjects, in the reformulation of administrative procedures in public-school systems, in the introduction of vocational education and vocational guidance, and in the advancement of play and recreation as agencies of education. From the beginning, however, it was most concerned to work out standards for the critical estimation of new tendencies and new proposals, and to give its students something of philosophic insight to guide them in the forced and almost breathless activities of the changing education of the time. It was quite apparent that the results of the sudden expansion in the study of education were streaky and uncertain. Not all the changes in the schools were good or destined to endure; much of the writing on education could not live. Responding to the temper and spirit of the University, the Division of Education governed itself, not by propagandist enthusiasm, but by the desire to achieve in its staff and in its students a balanced and critical understanding of the entire field. Its time and energy were much absorbed in finding a place and organization within the University which would enable it to accomplish this result with men and women capable of educational leadership.

The Division gathered momentum, to be sure, from 1906 to 1921. Among major appointments were those of Dr. Walter F. Dearborn, called from Chicago in 1912; Dr. Ernest Carroll Moore, called from Yale in 1913; George E. Johnson, called from Pittsburgh in 1915; and Dr. Alexander J. Inglis, called from Rutgers in 1914.[1] Other appointments were made before the School was founded, and the offering of instruction was several times reorganized and expanded. But the problem of providing a consistent professional programme quite clearly demanded the independence accorded to a separate professional faculty. The theory and organization of the University pointed to the establishment of such a faculty on a graduate level; and the needs and possibilities of the profession justified this step.

2. The Graduate School of Education, 1920–29

Hanus had advanced the idea of a School in 1903. In 1915–16 the Division of Education proposed to its Overseers' Visiting Committee that an endowment of two million dollars be obtained as a foundation for a Graduate School of Education.

The story of the raising of this fund is told in the first annual report of the new School. The devoted efforts of James J. Storrow (A.B. 1885), and of Jerome D. Greene (A.B. 1896), who became Chairman of the Overseers' Visiting Committee for the special purpose of raising this endowment; the benefactions of Felix M. Warburg, of John T. Pratt (LL.B. 1900), of John F. Moors (A.B. 1883), of his classmate Joseph Lee, and of Mrs. Lee; the first great gift of half a million dollars from the General Education Board in honor of President Eliot and of Hanus; and the assignment to the fund of another half million dollars by the Corporation — these factors went far toward assuring success. The fund was completed by coöperation with the Harvard Endowment Fund Campaign, and this first endowment for the School was named the Charles William Eliot Fund of the Graduate School of Education. Hanus shortly retired from active service and became emeritus, September 1, 1921. The first report ends with the words, 'The School stands as a monument to his vision and his zeal.'

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[1] This record would not be adequate without a statement of the loss the School sustained in 1924 through the death of Professor Inglis. He was one of its most helpful members, a scholar of wide reputation, and a man of eager, friendly spirit and high ideals. His service and fellowship have been commemorated in the Inglis Lectureship in Secondary Education, endowed by his colleagues, friends, and students.

On April 12, 1920, the Corporation passed a formal vote establishing the School, which opened the following September. It was the first department of the University to admit women to regular standing, and the existence of a profession of education was recognized by its new degrees, Master of Education and Doctor of Education. Success, as measured by increased enrolments, attended the School immediately, for the number of students advanced at once and increased steadily with each succeeding year. The total enrolment for the academic year 1926–27 was 529, and the enrolment in summer courses in Education in 1927 was 1073, of whom 563 were candidates for the Harvard degrees. Half the students in 1926–27 were women. During these years the School also built up a considerable surplus out of its income, while increasing its staff and spending liberally for research, publications, the library, and an appointment service for graduates.

In research, the most important single undertaking of the School has been a continuous study of the growth of children. In 1920 a Psycho-Educational Clinic was established for the measurement of intelligence and the testing of school achievement. A gift from Mrs. E. H. Harriman, then a member of the Overseers' Visiting Committee, helped to make this possible. In 1921 Dearborn conceived the simple but very fruitful idea of measuring the same group of children throughout the entire period of their school life by all the standard measures available, physical, mental, and pedagogical. The need for such a study may be seen when it is observed that no set of measurements as yet available reveals either the typical lines of individual development or the relations of the various factors in growth as a whole. The Growth Study, as Dearborn's undertaking has come to be called, seeks a more accurate basis for answering questions concerning individual human development. The research has required heavy expenditure and the labor of a considerable group of trained persons. For two years it was supported by the Commonwealth Fund, since 1923 by the School. Dr. Edwin A. Shaw (A.M. 1916) of Tufts College, a member of the Harvard staff from 1920 to 1927, had a large share in organizing the work and establishing its techniques. Although the final results will not appear for some years to come, the Growth Study has already been fruitful in many ways.[1]

Besides the Growth Study, the Clinic, and the Laboratory of Educational Psychology, which is also under Dearborn's direction, have done work of importance in the measurement of eye-movements in reading and especially in the study of cases of so-called 'non-readers.'[2] The staff of the Clinic has also conducted or participated in a number of surveys in which the testing of intelligence and school progress have been important elements. Dearborn's Group Tests of Intelligence, as well as the Form-Board and Performance Tests devised by Dearborn, Lincoln, and Shaw, have been widely used in the Clinic investigations and in similar work elsewhere.

In response to an insistent demand, the School organized in 1921 a joint Extension Service in coöperation with the School of Education of Boston University. Under the administrative direction of Professor John J. Mahoney (A.B. 1903) this service has grown from year to year, until it now includes (for the first half of 1928–29) fourteen courses enrolling 817 students. These courses are given in towns and cities in various parts of New England. Under certain conditions they carry credit toward the degree of Master of Education.

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[1] A new method of measuring the ossification of the carpal bones has been developed and reported in the monograph by Dr. D. A. Prescott entitled *The Determination of Anatomical Age in School Children and Its Relation to Mental Development.* Other published reports based on Growth Study data are: *Individual Differences in the Intelligence of School Children*, by Dr. Mary M. Wentworth; *Occupational Groups and Child Development*, by Dr. Stuart M. Stoke; and *Dentition as a Measure of Maturity*, by Dr. Psyche Cattell.

[2] Two monographs report partial results of work in this field: *Special Disabilities in Learning to Read and Write*, by Dr. Elizabeth E. Lord; and *Disability in Reading and Its Relation to Personality*, by Dr. Elizabeth M. Hincks.

Summer School courses, extension courses, and courses offered for part-time students during the late afternoon hours, in the evening, or on Saturdays, are all to be viewed as phases of the effort to meet the needs of teachers already in service. That anyone should enter upon a career in the schools without previous preparation, so that he must study during vacation or while teaching in order to obtain his basic technical training, is evidence of the low standards of qualification for teaching in this country. Instruction for teachers in service is a serious drain on the energies of the staff; but the School here faces a condition, not a theory. Even with much larger means at its disposal, it could not avoid the obligation to serve teachers who have already begun their work. In time the condition may change, perhaps in part as the result of the stand this School has taken. In one sense, the whole story of the latest and most significant development in the study of education at Harvard, the new plan of instruction adopted in 1927, may be read in the statement that the School has now set itself to serve, first of all, young college graduates without previous technical training or teaching experience, who are ready to enter seriously upon a prolonged and thorough training for careers in education.

When the School adopted this programme, it voluntarily courted loss both of students and of fees. It was in the conviction that its own material success ought, if necessary, to be jeopardized in the attempt to establish a new conception of professional preparation for educational careers, that the School decided to reorganize its instruction and set up new standards for its degrees.

The original suggestion for this reorganization came from President Lowell, and was formally presented to the Faculty at its meeting of April 3, 1924. The questions involved had been in the minds of the Faculty for some time, but had not before been brought to a focus. Recognizing that the salaries paid to teachers and school officers play a large part in determining the possible extent and severity of preliminary training for education, the Faculty felt, nevertheless, that salaries are themselves affected by generally accepted standards of preparation for school work. They decided, therefore, to take the risks involved in a programme more comprehensive and severe than any heretofore established by a university department of education.

This new programme is based on the idea that training for a career in education should be complete before the work begins. Since admission to the School is confined to holders of the Bachelor's degree, this means a graduate course of two years' duration. The School seeks young men and women without previous study of education, believing that professional preparation is most profitable when the student has devoted his undergraduate study to non-professional subjects. It seeks, in other words, educated men and women. It seeks also men and women who have had no previous experience in teaching or school administration, believing that the School itself can best provide for an initiation into practice, and that the theory of education can be grasped by good minds without preliminary and unsupervised floundering in classroom teaching or school management. It presents the opportunity for a thorough and well-coördinated curriculum, accompanied by apprenticeship, and it proposes that its master's degree shall stand for a mastery of principles and a tested command of materials and methods.

The new programme makes sure of scholarship on the part of those who are to teach subjects. Courses in the ordinary subjects of the secondary-school curriculum may be taken under the Faculty of Arts and Sciences, and students who expect to remain in teaching are advised in their selection of such courses by specialists in the Faculty of Education. Apprentice teaching is required as a training in the effective educational use of academic knowledge. The degree of Master of Education is awarded, not for course credits only, but on a general examination to test understanding of educational principles, and on a judgment rendered by the Faculty with respect to command of subjects and of teaching skills. Those who intend to enter upon educational administration or some form of special service are expected to obtain an adequate command of subjects basic to their interests, such as government (for administration) or psychology (for educational measurement). In every case the degree is to be obtained on the basis of success in a curriculum carefully arranged under Faculty advice. The whole scheme is designed as a thoroughgoing process of professional formation.

Doctoral study in the new plan is limited to students who have given positive evidence of constructive ability. The work for the ED.M. has no necessary relation to the work for the ED.D. The School has taken the position that research and constructive writing on educational problems are not to be expected of all students. No artificial requirements, which may be met by perfunctory or merely industrious effort, are imposed on candidates for the Ed.D., not even in the modern languages, but the student is expected to have shown his power and to see his way ahead. This very flexible scheme of doctoral work has been adopted in the expectation that it will help to maintain a high standard of accomplishment, even if the number of students it attracts is small.

The risks involved in these adventurous steps have not proved illusory. Enrolments and income have both decreased since 1927. The issue depends on many factors, some of them not within the control of the institution. The Faculty is united in the conviction that the new requirements are sound, that the training to be had in the School is effective, and that the future of the profession calls for these new standards. The outcome depends on the wisdom of those who are engaged in the undertaking and the support of those who perceive the needs of education in America.

PAUL H. HANUS

EDWIN F. GAY

XXXIII. THE GRADUATE SCHOOL OF BUSINESS ADMINISTRATION

1908–1929

By Wallace B. Donham, LL.B.
George F. Baker Professor of Business Economics and *Dean of the School*
and
Esty Foster, S.B.
Assistant Dean

1. The First Decade of the School, 1908–1918

BUSINESS training was under consideration at Harvard as early as 1885, but it was almost fifteen years later before this vague possibility developed into a probability, due to two projects fostered by President Eliot. He felt that the University should accept more responsibility in this direction because of the large proposition of its graduates even then entering Business.

His first project grew out of conferences with Professor Taussig of the Economics Department as to the responsibility of the University toward the increasing number of graduates going into business. William Morse Cole (A.B. 1890), who had instructed in economics from 1890 to 1893, was recalled in 1900 to initiate in the College an experimental course in Accounting, and soon proved its effectiveness. After thirty years, Professor Cole is senior member of a faculty of fifty in the Graduate School of Business Administration.

President Eliot hinted at the second project, a School of Political Science and Administration, in 1902.[1] It was not long after the Spanish War, the beginning of the Roosevelt era, when it was commonly supposed that there would be a great future demand for university-trained colonial administrators, diplomatists, municipal experts, and civil-service officials. Professor Coolidge of the History Department, much interested in this project, submitted it to his Division of the Faculty of Arts and Sciences in the autumn of 1906.[2] There it was deflected toward the economic side by including courses in Accounting, Banking, Insurance, and Railroading. The plan emerged from the Division of History and Political Economy as a 'Graduate School of Public Service and Commerce,' embracing six programmes preparing graduates for the diplomatic, consular, and colonial services, for general business, railways, and banking. The Corporation gave informal approval to the plan, although the projected preparation for the government services was abandoned as offering too restricted possibilities for graduates. In the spring of 1907 Professor Taussig assumed the task of raising funds. President Eliot, a staunch advocate of the proposed School, made the first public announcement before the Associated Harvard Clubs in Detroit on June 1, 1907. The sum considered necessary was $25,000 a year for five years. The General Education Board agreed to provide half, and a considerable part of the rest had been pledged, when the panic of 1907 put a damper on all such undertakings.

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[1] *Report* for 1900–01, p. 35.

[2] Coolidge, in drawing up this plan, had in mind the Ecole Libre des Sciences Politiques in Paris, whose graduates have almost monopolized the diplomatic, consular, and colonial services of France for over forty years. Recently this School, after consulting with the Harvard authorities, has established a department of business administration. — S. E. M.

Nevertheless, on March 30, 1908, the Corporation voted 'to establish a Graduate School of Business Administration, the ordinary requirement for admission to which shall be the possession of a Bachelor's degree, and for graduation a course of study covering two years.' It was again discussed in the Corporation on May 18, 1908, when it became clear that, unless the funds were raised forthwith, the new School could not be opened in the fall as had been planned.

Professor Taussig has described, in Bliss Perry's Life of Henry Lee Higginson, how on May 19 that generous benefactor of the University called him into conference, and after a few minutes' conversation authorized him to tell President Eliot that the entire sum was underwritten by an anonymous donor. The Corporation thereupon elected Edwin F. Gay of the Economics Department as Dean of the Graduate School of Business Administration.

The first catalogue of courses was published August 1, 1908. The School opened October 1 with 59 students and a programme designed for candidates for the new degree of Master of Business Administration. Only first-year courses were offered that year, 22 of them being grouped under the general headings: Accounting, Commercial Law, Economic Resources, Industrial Organization, Banking and Finance, Transportation, Insurance, Public Business,[1] and German, French, and Spanish Correspondence.

It did not, however, open as an autonomous graduate school, but as a Graduate Department under the Faculty of Arts and Sciences. This was done because President Eliot and Dean Gay felt that the close contact with the older departments would offer the new School a better opportunity to profit by their assistance and coöperation during its experimental stages.

Other American universities had provided training for business as early as 1886, and the movement had spread rapidly; but always as undergraduate study, with occasional provision for supplementary graduate courses. The Harvard School, consistent with its avowed purpose of establishing business as a profession, was a pioneer in requiring a college degree for entrance.

In constructing the programme of instruction, the problem was to discover, not only *what* essentials should and could be taught, but also *how* they could be taught. Courses on Accounting, Transportation, Insurance, Banking, and other tools of business were already being given in other schools, but something basic was obviously lacking. What was business fundamentally? A definition was evolved: 'Business is making things to sell, at a profit, decently.' This implied two basic activities: manufacturing, the act of production; and merchandizing or marketing, the act of distribution. In these no systematic teaching had been done, and the little available material was not organized for purposes of instruction. The School, therefore, must both train teachers and collect and organize the material for them.

To meet the immediate needs, as well as to effect the permanent solution through the training of teachers, the composite or coöperative lecture course was developed. The course was carefully planned in outline, and each topic of the syllabus assigned to an experienced business man; a teacher on the staff then organized instruction and set the examinations. This method was particularly useful during the first few years in Industrial Organization and Corporation Finance.

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[1] One course in Administration of Municipal Business was all that materialized of the original Eliot–Coolidge conception of the School as a training school for government and administration, and this course was offered only for the year 1908–09. The students at the Business School came for a different purpose, and in 1911 the Department of Public Business was properly transferred to the newly organized Department of Government, under the Faculty of Arts and Sciences.

A special advanced course was offered for the study of Frederick W. Taylor's Scientific Management. In the course on Corporation Finance the first year, the array of collaborators was especially noteworthy, including such men as Frederick P. Fish (A.B. 1875), George W. Wickersham, James J. Storrow (A.B. 1885), Wallace B. Donham (A.B. 1898), Robert F. Herrick (A.B. 1890), Thomas W. Lamont (A.B. 1892), and A. H. Joline. Other courses had the assistance of numerous outside lecturers to supplement the regular instruction; the course on Commercial Law followed the Langdell case system. Classroom discussion and frequent reports on assigned topics were employed in all courses.

To promote further the coöperation between vocation and education, and to give the students practical experience in applying their knowledge under guidance, employment was found in the summer of 1909 for six of the eight men who were to return to the School for their second year's work. This experiment proved so successful that it has ever since been considered a valuable part of the course.

In fields such as Industrial Organization (factory organization and management), Banking, and Finance, considerable written material was already available, so that the formation of a library designed for the needs of the School was of primary importance. At the end of the first year, a start had been made toward collecting financial reports and other business documents which could be used for the development of the 'problem method' of instruction aimed at by the School. The space assigned in old Gore Hall was soon found inadequate for the increased number of students, so that in the summer of 1910 a 'commodious reading room' was prepared in Lawrence Hall, for the reference books and other material.

At the same time, President Lowell gave permission for the Business School Club to furnish an adjacent room for their own use. The club had been founded during the second year of the School by the students, in order to promote discussions on subjects related to their work, and to give them an opportunity to invite prominent business men and professors for informal talks on their own fields.

The field of Commercial Organization (marketing) was not so fortunate as those of Industrial Organization, Banking, and Finance in the amount of published source material available.

Beginning with the spring of 1911, therefore, the School appropriated annually a sum to pay the travelling expenses of teachers on the quest for business facts in this field during their summer vacations. This action was decided on by the Dean and Mr. Arch W. Shaw, who has been an active friend of the School almost from its inception (a student in it for one year, and a teacher of Business Policy for six years), and took form when Professor Paul T. Cherington spent the summer of 1910 in Panama, Costa Rica, Guatemala, and a number of cities in the United States, to gather material on the trade in certain products. A further step along this line was taken in the winter of 1910–11, when Selden O. Martin (A.M. 1904, PH.D. 1912) was sent to South America.

About the same time, through the initiative and generosity of Mr. Shaw, a fund was established to be known as the Shaw Fund for Business Research. It was determined after a series of conferences to begin with a study of conditions in the retail boot and shoe industry, and preparations were made to send two investigators into the field for the summer of 1911. Professor Cherington and Clarence B. Stoner (M.B.A. 1911) undertook to visit scores of merchants in that field in the Middle West. In order that these investigators might have appropriate standing in their contacts, the term 'Bureau of Business Research of the Harvard Graduate School of Business Administration' was invented for them. As a result of that summer's work a uniform system of accounts was devised, and the merchants began reporting operations in this standard form. By 1913, 600 shoe retailers were coöperating in this service.

With the course on Commercial Law under Professor Lincoln F. Schaub (LL.B. 1906), based on the Langdell case system; the Accounting course developed by Professor Cole on the basis of problem work; and with frequent 'laboratory' trips to neighboring plants in connection with Industrial Organization, classroom discussion along these lines was assured. Presentation of the meagre facts on Commercial or Business Organization, however, in such a way as to provoke interest and discussion by the students, was a more serious problem. Dean Gay in 1912 recalled from New York University Melvin T. Copeland (A.M. 1907), who had previously assisted him in the College, to give a course in Business Statistics by the discussion method. The following year, on 36 hours' notice, Copeland was given half the class in Commercial Organization and Methods of the United States.

After he had had this class about a week, Copeland met the Dean in the Yard and, answering the question as to how he was getting on, said 'I have found enough to talk about.' The Dean remained silent for a moment before replying, 'That is not the question: have you found enough to keep the men talking?' This remark, according to Dr. Copeland, demoralized his course for the year; but inspired him to gather the facts and organize them into the outline on Marketing which was first used in 1915, and which, in amplified and revised form, is still used both in this School and in many other schools offering similar courses.

The problem method of instruction was, briefly, an attempt to introduce into teaching business a combination of the case method of teaching law and the clinical method of teaching medicine. This was difficult because the case records were not nearly as full or as reliable as were law records; nor was clinical material as easily available or clinical problems as clearly defined as in medicine.

The five-year experimental period closed in 1913, and it was, therefore, fitting that the Business School should take its place with the other graduate professional schools of the University. This action was taken in June, 1913.

The curriculum had gone through various vicissitudes during the first six years, as the presence or absence of a suitable instructor, or funds, dictated. In 1911, Mr. Shaw started a course in Business Policy, assisted by Dr. Martin. Dr. Copeland's pioneer course in Business Statistics in 1912–13 has already been mentioned; in that same year Professor O. M. W. Sprague gave new courses on the Financial Management of Local Public Service Corporations and of Industrial Corporations. The former led the following year to a coöperative course on Public Utilities Operation under the direction of Eliot G. Mears (A.B. 1910). At the request of the Forestry School, a course on Lumbering also was given in 1914–15; but the most important change effected that year was to distinguish Marketing as a separate department, on the basis of Copeland's Outline, and to distribute other subjects formerly covered under the head of Commercial Organization. Courses which had been given since 1913 on Trade Associations and Chambers of Commerce were given in the next year a separate Department, for secretaries of Chambers of Commerce.

By the year 1914–15, the growth of the School and the loyalty of its graduates and former students called for the formation of the Harvard Business School Alumni Association, to weld this rapidly growing body of alumni together and to stimulate its coöperation.

In the spring of 1917, the cloud of war had settled over the Business School; so many students were leaving to enter national service that early examinations were given to accommodate them. At the request of the Council of National Defense, two special war courses were given from June 18 to July 28, on Military Stores Keeping and Cost Inspection for War Contracts; intensive work in handling government supplies was offered to the Harvard Reserve Officers Training Corps; and Cole, who was commissioned as Captain in the Quartermaster Reserve Corps, prepared a course of instruction for supply officers in other training schools.

The full effect of the war was not felt until the academic year 1917–18, when the registration dropped from 232 students to 97, and several members of the Faculty were called into service on the Council of National Defense, the Shipping Board, the War Trade Boards, and the Commercial Economy Board, the War Industries Board, and the United States Railroad Administration. The School also coöperated with other departments of the University in giving instruction to members of the Students' Army Training Corps and the Naval Unit established at Harvard.

In the first decade of the School's history it had grown from an idea into an international institution. From the first year, when 80 students came from 14 colleges and 12 states, the School had expanded in scope as well as size. In the year 1916–17, the enrolment was 232, drawn from 84 colleges, from 35 states and territories, and from 3 foreign countries. In the first year, special students constituted 60 per cent of the enrolment, and only 10 per cent of the total returned for their degrees in the second year; in 1916–17 the special students constituted only 17 per cent of the total enrolment, and almost 45 per cent of the preceding first-year class had returned.

More important, however, than numbers of students was the successful overcoming of that prejudice and scepticism which the professional training of business men met among a part of the community. The School had demonstrated its right to live and expand as a definite and permanent force.

2. Growth and Expansion, 1919–1929

The second era of the Harvard Graduate School of Business Administration began in 1919, coincident with a nation-wide increase in the demand for collegiate business training. The full usefulness of the School was made possible by the George F. Baker Foundation in 1926.

The justification for business training from the students' point of view was greatly emphasized after the war, due to a growing appreciation of the increasing complexity of the business unit. In the intricacies of a modern business organization, it is more and more difficult to acquire the broad background of fundamental principles requisite for later executive responsibilities. Recognition of this has established in this generation the value of organized training for the transition from college to business, just as earlier generations made the the same discovery in law and medicine.

Immediately after the war our growth was too rapid. Neither the teachers nor the teaching material existed anywhere to give adequate training to students in such numbers as applied all over the country. For a time the influx of business students into the undergraduate schools and colleges not only constituted a menace to a liberal, non-vocational, educational policy, but also jeopardized the future of business education itself. During this trying period the Harvard Business School, predicated on graduate instruction and committed to research, was in a peculiarly favorable position. Even here, however, the growth in numbers constituted a real problem. In 1918–19 the enrolment was 159, the following year it passed 400, and in 1928–29, 872 men were registered in the School. Nor was this growth local as the enrolment in this last year represented 203 colleges, 44 states, and 14 foreign countries — a distribution comparable with other graduate departments of the University.

During Dean Gay's service in Washington and after his resignation to become president of the New York Evening Post, the School was ably administered by Professor Schaub as Acting Dean. In the fall of 1919, just at the time when without warning the enrolment more than doubled, Wallace B. Donham, formerly Vice-President of the Old Colony Trust Company, became Dean of the School. Much of the preliminary experimental work had been done. Many things had been tried: most with good results, some only to point out paths to avoid. Because of the war, the appraisal of this experience had been delayed; and with increased enrolment and a depleted faculty, a series of problems pressed for immediate solution.

The curriculum had to be reorganized; a war-scattered faculty had to be reconstructed; new methods of teaching had to be developed and new teaching materials provided. The School's income was inadequate, and new buildings and endowment were essential.

3. Curriculum

The reorganization of the two-year course leading to the degree of Master of Business Administration was the first task which the faculty undertook. After a complete survey, two important developments took form, with the object of assuring (1) a broad foundation of general business training for every student, and (2) the more judicious choice by students of courses leading to the specialized business careers for which they were preparing.

First, all students were required to take an introductory course in each of the main subdivisions of business: Finance, Industrial Management, and Marketing; and in Accounting and Statistics, the main tools of executive control. The second-year course in Business Policy was developed as a general coordinating course, tying together the work in all the divisions. Second, all second-year courses were combined in study groups looking toward the careers of Accounting, Banking and Finance, Business Statistics, Foreign Trade, Industrial Management, Lumbering, Marketing, and Transportation. Public Utility Management and Real Estate Management were added as soon as sufficient case material had been collected. Each student might elect any one of these groups.

These changes proved important forward steps. They preserved, and indeed increased, freedom of election while in the School, and greatly increased the possible electives of life by assuring broad training in fundamentals. Within each study group opportunity was given to elect courses in Business History, Business Aspects of Law, Business Ethics, and Business Economics, which cut across the arbitrary boundaries set up for instructing purposes. The new plan eliminated haphazard choice of courses without intelligent consideration. A thoroughly rounded training was required without over-intensive specialization. The result was a distinct improvement in the quality of work, and much less difficulty with disappointed students.

One of the responsibilities of the School lies in the preparation of teachers of business, of whom there is a serious shortage. To meet the needs of those who desire to teach in this field, a course covering at least three years' work, leading to the degree of Doctor of Commercial Science, has been instituted.

The School also owed a great debt to business itself, whose active coöperation had not only kept the School in being, but had made possible the gathering of case material. In recognition of this debt, the School instituted, on an experimental basis, a special session in the summer of 1928 for business executives. For them, the case method of instruction was ideally suited as it presented tributary facts from which they were accustomed to reasoning.

4. Faculty, Teaching Methods, and Research

Before the Great War intervened, the Faculty had been organized for a maximum enrolment of 232. To teach the 412 students enrolled in the fall of 1919, there remained a handful of instructors just returned from war service, and as thoroughly disorganized intellectually as was the younger generation. Ten additions were made to the staff immediately, several being recent graduates of the School. Fortunately, the bulk of the School instruction at that time was given by lectures which were adapted to the teaching of large courses; but even then, the pre-war maximum of 142 in one teaching section had to be more than doubled. Gradually it has been possible to increase the staff, until in 1928–29 it includes thirty-two appointees of professorial grade, fifteen instructors, and four lecturers.

Concrete problems collected by the teaching staff of the School had been used to supplement the lectures, and students had been assigned isolated bits of business research as part of their training. No systematic effort had been made to develop in orderly sequence, from executive problems as they actually arose, the facts, methods, and principles applicable to a particular business field as a whole. Nor did any body of problems exist which could be so used.

The present Dean was trained under the case system in the Harvard Law School, and believed that this method could be further adapted to the systematic teaching of all business subjects. This presented serious practical difficulties. No library of such material existed as in the legal field; collected articles and treatises on business subjects did not fill the requirements, because the business problem for teaching must be stated as it comes to the business executive, rather than as it has been considered by the business economist. The research problem involved was large, and no funds were available. Nevertheless, Professor Copeland was urged to undertake the experiment both of research and teaching by this new method, in his field of Marketing. Friends of the School furnished money and opportunity. The experiment was successful from the start.

The first case book, Copeland's Marketing Problems, was published in the summer of 1920. The following year, five more case books appeared: Schaub and Isaacs' The Law in Business Problems, Lincoln's Problems in Business Finance, Dewing's Problems on Financial Policy of Corporations, Tosdal's Problems in Sales Management, and David's Retail Store Management Problems. In addition, a substantial body of miscellaneous material for other courses was collected. The School's case books now number seventeen, some in second or third editions, and more in preparation. One or more are used by about 150 colleges and universities.

This method for the teaching of business presented many new problems both in research and in technique of classroom presentation, and the research problems are by no means worked out yet. The exact type of organization which will best combine the experience and active interest of the instructor with the practical aid of the research staff of the Bureau of Business Research is still unsettled; but much has been accomplished, and the effectiveness of instruction gradually increases as new material is obtained. The value of this material is not limited to the classroom. It proves to be a stimulating and essential basis for developing the theory of business.

In the classroom use of cases, differences appeared, as compared with the teaching of law. The business case usually, but not invariably, differs radically from the law case in that it contains no statement of the actual decision reached by the business man. Moreover, the methods of approach to a decision are not included in any reasoned opinion similar to the opinon of a court, and many business cases admit of more than one solution. This imposes on the teacher of business a definite obligation to finish the classroom discussion of each case with a clean-cut summary of the reasons and analogies which appeal to him as most important. The case method has important advantages in stimulating independent thought by the student before the case is discussed in class, as well as in furnishing the broad background of diverse industries which the analysis of cases brings to him.

To make this case material readily available to business men, another leaf was borrowed from the law. Selected cases, with commentaries by members of the staff, are compiled into a series of adequately indexed volumes called the Harvard Business Reports, in order to provide business managers with an opportunity to make better use of business data, to base their current executive action on broader precedents than those within their own concerns, and to choose among several solutions of the same problem the one best adapted to their own conditions. The publication of these reports emphasizes the necessity for a thorough and scholarly classification of the whole field of business, which is being undertaken through a farsighted gift to the Business School Library.

A quarterly magazine, the Harvard Business Review, analogous to the Harvard Law Review, was started in 1922. This serves as a medium for pointing out the relation between fundamental economic theory and the everyday experience and problems of the executive in business, thus developing a theory of business. A faculty editor, working with an editorial committee, and students chosen primarily on the basis of scholastic standing, direct this undertaking.

The Bureau of Business Research has also continued its statistical studies into many trades. In addition to the retail shoe and retail and wholesale grocery trades in which pioneer work had been done, studies were made in retailing jewelry, tires, automobile accessories, and stationery; and in wholesaling automotive equipment, dry goods in the South, paint and varnish, and building supplies. Gradually, the Bureau plans to extend the scope of its work into the fields of production and finance. As in its work in the collection of cases, here too the School's success in obtaining the facts and figures of business rests on the confidence of business in the School's integrity in the use of confidential material, and in the faithful portrayal of facts as obtained from the business community.[1]

5. Finance and Buildings

Faculty and friends of the School had agreed that 'business education should not be conducted on the basis of annual deficits incurred by giving training below cost, but that the actual cost properly chargeable to each student should, after deducting the income from the very moderate endowment fund of the School, be met by the tuition fee.' Consequently, as the deficit grew with the increase in enrolment and the depreciation of currency, the tuition fee had to be progressively raised from $200 in 1919–20 to $500 in 1925–26.

During these years, the increased tuition was definitely bound up with the problem of endowment. It was felt that the School could not seek endowment without first demonstrating the quality of its instruction, and yet with insufficient income, high quality of instruction was impossible.

With the increase in tuition, further demands were made upon the School's student loan fund, which had been only $675 in 1916. By 1929, about $150,000 was in the fund, and $100,000 was still needed to keep it revolving. Students' notes are payable three years from the July 1 following the date of signing, with interest at 6 per cent. Renewals are provided where necessary. The School's experience with student loans is very satisfactory.

Increased tuition and loan funds did not solve the School's major financial problems. Adequate classrooms, proper library facilities, living quarters for students, research funds, and general endowment: all were wanting. As the School grew, classes and offices overflowed from Lawrence Hall into the New Lecture Hall, Emerson, Harvard, and University Halls, the Harvard Union, Widener Library, the Semitic and Peabody Museums, and into a temporary building on the site of the new Fogg Art Museum. The Library overflowed from one room to another on the upper floor of Widener, and even into the hallways. Living quarters for the students, by offering an environment conducive to forming a socially and intellectually coherent group, constituted an important phase in the task of building the concept of business as a profession.

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[1] To further research in the field of business history, *The Quarterly Journal of Economic and Business History* was begun in 1928 as a joint publication of the School and The Business Historical Society. This latter organization is made up of business men devoted to the preservation of original records and other business materials, and has its headquarters in Baker Library. Edwin F. Gay, who had returned to the Faculty of Arts and Sciences as Professor of Economic History, is the editor, and N. S. B. Gras, Professor of Business History in the School, managing editor, of the *Quarterly*.

The story of the campaign to raise $5,000,000 for buildings constitutes a fascinating chapter in the history of the School. Late in 1923, Bishop Lawrence, a member of the Corporation, became interested in the project, and agreed to take the active lead in an effort to establish the School on a proper basis. In order not to prejudice the needs of the Chemistry and Fine Arts departments for $3,000,000 and $2,000,000 respectively, these were included by the Business School in a united effort to secure $10,000,000 to develop the University's national service. The campaign officially opened on President Eliot's ninetieth birthday, March 20, 1924. Bishop Lawrence, in his Memories of a Happy Life, describes in detail how the campaign for the Business School came to a happy and unexpected close. It will be sufficient here to quote a few words of his interview with George F. Baker of New York, the 'dean of American business,' in which Mr. Baker first said that he had 'lost interest' in the Bishop's suggestion that he should give the first million: 'My life has been given to business and I should like to . . . give a new start to better business standards. I want to do it alone.'

As Bishop Lawrence has said, 'Great and noble as a gift may be, its value is always enhanced by the manner of the gift, the graciousness and humility which accompany it. Under this test, the gift of Mr. Baker stands and always will stand very high in the esteem, affection, and gratitude of Harvard.'

The location selected for the George F. Baker Foundation was on the Boston side of the Charles, opposite the Freshman dormitories, and across North Harvard Street from Soldiers Field. The group of buildings includes living quarters for students and unmarried members of the Faculty; dining halls, and faculty and student clubs; a library building which accommodates classrooms and research staff and is so designed that it will permit the future growth of collections; an administration building to provide offices for the teaching and research staff. These buildings are making possible all that we hoped for.[1] Friends and associates of John W. Weeks, late Secretary of War, erected in his honor a new foot-bridge across the Charles, east of the Anderson Bridge. In 1928 work began on a Dean's House, and on two new wings of the Library. In the Library, the Nelson W. Aldrich Library of Finance occupies a separate room equipped by the senator's heirs.

The dedication of the Business School group constituting the George F. Baker Foundation took place on June 4, 1927, before a distinguished body of men gathered to do honor to the donor and to his high purpose.

With its magnificent new group of buildings, the School was still inadequately equipped with endowment to expand the teaching staff to a degree commensurate with the growth of the School, to keep up the Library, and to provide for continued research. Case collection involves constant expenditure in keeping materials up to date — for case books in business become obsolete in about three years. The Library is called upon, not only to provide the essential business background of the past, but to keep abreast of the enormous literature of the present day, developing on every hand in the varied and changing business field. Hence the need for endowment remained very great. From $475,000 in 1920, it was increased by generous gifts to over $2,500,000 in 1928, largely through an offer of Mr. Baker to give us $1,000,000 more if we could match it. Fortunately, another good friend of the School, Mr. William Ziegler, Jr., did match it, and founded in memory of his father an endowment for teaching and research in international relationships. In addition, about $100,000 a year income from dormitories will eventually be available for research. Yet even now the School possesses only three per cent of the University's endowment, although ten per cent of the University's students are in the

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[1] The University named the central building of the group the Baker Library. At Mr. Baker's suggestion, the faculty and administrative building was named Morgan Hall in honor of J. Pierpont Morgan, and the living halls and instructors' houses, in honor of Robert Morris, Superintendent of Continental Finances, and seven outstanding Secretaries of the Treasury: Alexander Hamilton, Albert Gallatin, Salmon P. Chase, Hugh McCullo h, John Sherman, Carter Glass, and Andrew W. Mellon.

Business School; and the amount of research that can now be accomplished is only a small part of what could and should be done.

The special problems of business education are still new, so that the School has little to guide its course save its own brief experience. For a long time to come, therefore, it may be characterized as a research laboratory with ever-widening scope. The remarkable changes wrought by science during the last two generations, so visibly affecting our physical and economic surroundings, are continually altering our human environment. Since control of the economic phases lies so largely in the business group, the new profession of business faces the serious task of adapting itself and humanity to the new order.

New principles must be found in dealing with this constant and rapid change, and one of the major fields in which new principles must be sought is in the ethics of business. Study and research, rather than the slow sifting of social evolution, must develop a specialized ethical system for this new profession. Young men must be fitted ethically as well as intellectually to assume positions of leadership, not only in their business community, but in their social environment. To this end the Harvard Business School is exerting its effort to train men in intellectual curiosity, breadth of vision, resilience, and analytical power to shoulder business responsibilities among rapidly changing surroundings; at the same time, through consciousness of the social responsibilities of their profession, to carry with them a sense of trusteeship. There is a close analogy between the position of the governing class in the earlier, simple societies, and that of the business group in our present complex social organization.

In the short span of twenty years' history of the School, an ideal of the socially responsible business man has been nurtured, to be implanted in successive generations of students leaving the School to enter the world of business, which President Lowell described as the oldest of the arts, but the newest of the professions.

'Dreading to leave an illiterate Ministry to the Churches,' the founders of New England established Harvard College. As Owen D. Young said at the dedication of our buildings, Harvard is now striving to guard against an illiterate ministry of business.

XXXIV. THE BLUE HILL OBSERVATORY

1884–1929

By Alexander G. McAdie, A.M.

Abbott Lawrence Rotch Professor of Meteorology and *Director of the Observatory*

SOUTH of Boston the land gradually rises, culminating in the Blue Hills. The highest of these, the Great Blue Hill, is ten miles south of the Astronomical Observatory in Cambridge, and has an elevation of 196 meters (635 feet) above mean sea level. The Indian name for the Blue Hills is the original of the name Massachusetts, and the range attracted the attention of Captain John Smith and other early explorers along the New England coast. On clear days the Observatory can be seen from ten to twenty miles off-shore, while the horizon thirty miles to the east can be seen from the building itself. Mt. Wachusett, forty-four miles away, and the Grand Monadnock, sixty-seven miles to the west-northwest, are easily visible on clear days.[1]

Abbott Lawrence Rotch, while yet an undergraduate at the Massachusetts Institute of Technology, became interested in problems connected with the weather. In the fall of 1884 he began the construction of an observatory on the summit of Great Blue Hill. The original building was a two-story circular tower eight meters high and nearly four meters in diameter, built of native stone. On the south side of the tower a wooden structure was built, containing two bedrooms, a dining room, kitchen, and stable.

On January 31, 1885, Mr. Rotch and Willard P. Gerrish, who was to act as Observer, moved into the building. The first night was bitterly cold, and as heating arrangements were incomplete, the experience of the two men was far from pleasant.[2] In the course of the year, the Blue Hill Meteorological Observatory became a department of Harvard University, with Rotch as Director. He was also appointed Professor of Meteorology in 1906.

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[1] Nobscot, distant 32 kilometers (20 miles), is visible 300 days in a year; Wachusett, 74 kms., 248 days; and Monadnock, 110 kms., 170 days.

[2] February, 1885, with one exception (January, 1920) was the coldest month in a period of forty-five years. The mean temperature was 16.5° F, or −8° C.

Any edifice on the summit of Blue Hill is exposed to high winds. During the winter months of 1923–24 there were no less than thirteen storms, in each of which the wind reached a velocity of eighty miles an hour or more. In one of these gales, that of January 11, 1924, the copper roof on the new library was torn off. Heavy sheets were carried thirty feet distant.

In addition to the Observatory on the summit two auxiliary stations were maintained for many years, one in the Neponset Valley, discontinued after thirty-three years of operation, and another at the base of the hill, still in operation. These stations enabled us to study the inversion of temperature at low levels. One of the most marked of these inversions occurred on January 5, 1904, when the temperature in the valley was −32° F, that is 64 degrees below freezing on the Fahrenheit scale. The lowest temperature recorded in forty-three years at the summit is −17° F, on December 30, 1917.

The same foresight which was shown in the selection of the site and construction of the building is evident in the choice of instruments and general equipment. Of equal importance with the many scientific contributions of Professor Rotch was the pioneer work, often arduous, which he performed in visiting and studying the leading observatories in Europe and elsewhere with the view of obtaining for American institutions the latest and best methods and apparatus. For many years Professor Rotch was the liaison meteorologist of the New World and the Old. He visited and published interesting accounts of the Deutsche Seewarte, the Royal Prussian Institute, the Austrian Central Institute, the Observatories at Berlin, Cologne, Magdeburg, Cracow, Prague, Pola, Zurich, and St. Petersburg; also Pawlowsk, Tiflis, and Dorpat. In 1892 he made a detailed study of high-level stations in France, and in 1893 travelled through South America. He made six ascents of Mont Blanc, reaching the summit (4810 metres) three times and the famous Vallot cabin (4366 meters) five times. At many International Meetings he was the sole representative of our country. He enjoyed the personal friendship of Hann, Köppen, Mascart, Hellman, Shaw, Hildebrandsson, Hergesell, Eliot, Walker, and others.

Rotch died on April 7, 1912, at the age of 52. He bequeathed the Observatory, together with the sum of $50,000, to Harvard University. The new chair of Meteorology was named after him and combined with the Directorship of the Observatory, to which Alexander McAdie (A.M. 1885), at that time serving in California as Professor of Meteorology in the United States Weather Bureau, was appointed in April, 1913.[1]

Many whose names are well known as investigators of aerographic problems have carried on their researches at Blue Hill. Professor S. P. Langley was frequently an interested observer of the kite flights, also Mr. Orville Wright.

Professor Robert DeC. Ward (A.B. 1889) had general supervision of the work following the death of the founder, until the arrival of the present Director. Dr. Charles F. Brooks (A.B. 1912), Mr. G. W. Pickard, Dr. Andrew H. Palmer (A.M. 1909), Dr. George Porter Paine (A.B. 1905), and Dr. Willard J. Fisher may be mentioned as Research Assistants.

From December, 1917, until the close of the World War, instruction in aerography was given to sixty-two officers and men of the Naval Reserve, all but four of whom received commissions. Thirty-nine, including the Director, served overseas. There was no charge for instruction in or use of apparatus. The Director served in France as Lieut.-Commander, U. S. N. R. F., acting as Senior Aerographic Officer. Later, he was assigned to the U. S. S. *Baltimore* in connection with the first trans-Atlantic air flight by the N. C. hydroplanes.

Records of pressure, temperature, humidity, wind direction and velocity, sunshine, night cloudiness, precipitation, and certain phenological data relating to seasonal characteristics have been maintained without interruption for forty-three years. These were published as separate volumes in the Harvard Observatory Annals until 1926, and since then as separate volumes by the Observatory.

Many papers have been contributed to scientific journals by members of the Observatory staff. A full list would cover many pages, and only a limited number can be mentioned here.

Naturally a study of the proper exposure of instruments would receive early attention; and the first set of professional papers contains 'Comparisons of Thermometer Shelters,' and 'Studies of Differences between Base and Summit Temperatures.'

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[1] The names of those who have served as Observers are: Willard P. Gerrish, 1884–85; Henry Helm Clayton, 1885–1909; Sterling P. Fergusson, 1886–1909; Arthur E. Sweetland, 1896–1903; Louis A. Wells, 1902–.

Probably the most comprehensive investigation undertaken at the Observatory has been in connection with the determination of the height and velocity of clouds. Beginning in 1888, detailed study of cloud frequency, density, velocity, and height was begun. Many valuable papers have been published by Clayton, McAdie, and others. Nephoscopes, pole-star recorders, and much auxiliary apparatus in connection with the measurement of clouds, now in use elsewhere, originated at Blue Hill Observatory. Comparison of anemometers of different types was discussed by S. P. Fergusson in 1891.

Kites were first used at Blue Hill Observatory by the present Director in 1885, and again in 1891–92, in making observations of atmospheric electricity. In the summer of 1894, Mr. William A. Eddy spent two weeks at the Observatory, and on August 4 a Richard thermograph adapted for the purpose, weighing about one kilogram, was carried to a height of 436 meters, and an excellent record of temperature obtained. Five Eddy kites were used, having a total area of nine square metres. So far as known, these were the first self-recording instruments carried aloft by kites. The first baro-thermograph was sent aloft on August 19, 1895, and the first thermo-anemograph November 16. In February, 1897, a windlass with strain pulley controlled by a steam engine was employed.

In 1899, publication of special bulletins was begun. The first three were 'Studies of Cyclonic and Anti-cyclonic Phenomena with Kites,' by H. Helm Clayton; 'Study of Two Remarkable Snowstorms,' by A. E. Sweetland; 'Kite Work in 1897–98,' by S. P. Fergusson. During 1899 records were obtained from the kite meteorograph in twenty-five flights, the average height being 2256 meters (7400 feet) and the maximum 3792 meters (12440 feet). During 1900 there were twenty-four flights with an average height of 2576 meters (8450 feet) and an extreme height of 4815 meters (15,800 feet).

During the summer of 1899, at the suggestion of Samuel P. Langley, experiments were made to ascertain if kites might be used advantageously to lift terminal wires for radio purposes. Signals were transmitted from a kite aerial to the tower of Memorial Hall, Cambridge. This work was carried on chiefly by G. W. Pickard, who has since elsewhere made many interesting experiments in connection with the transmission of radio signals.

A record of temperature made at Milton for fifty years, beginning January 1, 1849, by Mr. Charles Breck, was studied by Mr. Sweetland, and by suitable reduction a composite table of temperatures for a period of seventy-seven years is now available. The warmest day in the whole period was July 3, 1911, when the temperature rose to 99.4° F. The lowest temperature is −18° F, which occurred on December 30, 1917. A temperature equally low probably occurred on January 24, 1857. This makes the total range 117.4 Fahrenheit degrees.

By the beginning of 1903 the enlargement of the Observatory was completed, excepting that the stone tower, rendered unsafe by the percolation of water, had to be replaced by one of concrete in 1908. A two-story stone building, with a floor space seven by five meters, was built on the southwest side of the old building. This gave additional room for library purposes, as well as space for housing six large kites. The library is fitted with steel shelving, and the stacks will hold five thousand volumes. At present, the library contains 8372 volumes and 16,773 pamphlets.

On August 22, 1901, Rotch and assistants succeeded in flying kites from a tug-boat cruising at moderate speed in Massachusetts Bay, and this at a time when practically calm conditions prevailed ashore and at Blue Hill. This naturally led to experiments at sea, and on a voyage from Boston to Liverpool in August–September, 1901, the kites were flown on five of the eight days. The data obtained are probably the first at a considerable altitude over the Atlantic. In 1905, in coöperation with M. Léon Teisserenc de Bort, an investigation of conditions in the trade-wind region and doldrums was undertaken. M. Maurice of Trappes Observatory and Mr. Clayton of Blue Hill, on board the steam yacht *Otaria*, went from the Mediterranean to within nine degrees north of the equator. The highest of nineteen flights was 2300 meters (7500 feet). Observations were also obtained on two peaks in the tropics, and by means of pilot balloons at the Azores, Madeira, Canary, and Cape Verde Islands, an extreme height of 13,600 meters (44,620 feet) was reached.

A few of the many contributions to our knowledge of atmospheric conditions published in various scientific journals by members of the staff, are: 'Ice Saints,' by Waldo E. Forbes (A.B. 1902); 'The Ice-storms of New England,' by Charles F. Brooks;

'The Measurement of Atmospheric Humidity' and 'Aerodynamics of the Psychrometer,' by George Porter Paine; 'Velocity of Sound in Free Air,' 'Tables of Saturation Pressures and Weights of Water Vapor,' 'Cloud Classifications,' and 'Cloud Formations as Hazards in Aviation,' by the Director.

The Observatory has an endowment fund of approximately $200,000, and the replacement value of the buildings and equipment would probably exceed $100,000. It has never received any financial assistance from federal or commercial sources, or from any of the various well-known funds for endowment of research institutions. The aim of the present Director has been to carry out, so far as means would allow, the wishes of the founder: that the Observatory should be free from official routine and control. The Observatory does not issue forecasts of weather for the public, but for many years it has furnished public-service corporations with information regarding impending changes.

In commending an effort to secure a larger endowment, President Lowell said recently, 'Much may yet be learned that will conduce to a better knowledge of the weather, and will make safe and profitable navigation of the air which man has annexed as a part of his domain. Hitherto the Blue Hill Observatory has done its work with insufficient endowment and it well deserves support.'

XXXV. THE MEDICAL SCHOOL

1869–1929

By Frederick C. Shattuck, M.D.[1]
Jackson Professor of Clinical Medicine, Emeritus
and
J. Lewis Bremer, M.D.
Associate Professor of Histology

1. Introduction

THE date 1869 marks logically the beginning of a period in the history of the Medical School, of a change from what was practically an independent proprietary school to a University institution. It marks also the dawn of a revolution in medical ideas and medical training, based on the new work of Pasteur and the realization of the marvels revealed by the microscope, and on the physiological methods of study, then in their infancy in France and Germany. The initial steps in the reformation of the School were stormy and rapid. In order to understand the magnitude of the changes accomplished within a few months, it would be well to review briefly the earlier years of the School.[2]

The Harvard Medical School was originally intended to supplement the prevailing practice of apprenticeship, whereby a student attached himself to an older physician and thus learned the art from practical training. The first medical professorship was voted by the Corporation in 1782, when John Warren (A.B. 1771) [3] was appointed to the chair of anatomy. Shortly after this two other chairs were created with Benjamin Waterhouse and Aaron Dexter (A.B. 1776) as incumbents, and the Harvard Medical School dates from the formal induction into office of the three professors in 1783. The lectures of the new School were delivered in Holden Chapel. All the teaching was open to undergraduates, though it was more especially intended for those who were for the rest of the year medical apprentices. The course lasted only four months. The first degrees in Medicine were given to two students in 1788.

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[1] Dr. Shattuck, who cheerfully undertook the preparation of this chapter at the age of eighty, died January 11, 1929, before completing more than a preliminary draft. A memoir of him will be found in the *Harvard Graduates' Magazine*, xxxvii (1929), 312–322. Dr. Bremer most kindly consented to complete the chapter. — S. E. M.

[2] General reference may here be made to T. F. Harrington, *The Harvard Medical School, a History, Narrative and Documentary, 1782–1905* (3 vols., 1905), and *The Harvard Medical School, 1782–1906* (Boston, 1906), a coöperative work.

[3] John Warren, 'A Sketch of the Life of John Warren, M.D., the first professor of Anatomy in the Medical School,' *Harvard Medical Alumni Association Quarterly*, no. 5 (1902), 201–229.

In 1810 the School removed to Boston, to rooms adjoining Warren's private dissecting rooms in what is now Washington Street, just south of the Old South Church. For several years a few lectures were also given to undergraduates in Holden Chapel by the indefatigable Warren, though his journeys from Boston to Cambridge on horseback made, as he complained, lamentable inroads on his valuable time. This move to Boston was caused by the need of actual contact between students and the sick. Warren's position as one of the founders of the military hospital and his service with the Boston almshouse, besides his large private practice, offered ample provision for this. Later, in 1821, when the Massachusetts General Hospital was opened through the efforts of James Jackson (A.B. 1796) and John Collins Warren (A.B. 1797), the son of John Warren, the relations between Hospital and School became very intimate. In 1816 the School moved to a building of its own in Mason Street, and thirty years later to a new building in North Grove Street, adjoining the Hospital.

Down to 1869 the connection of the School with the University was merely nominal. The governing boards of the University simply conferred degrees voted by the Medical Faculty, and confirmed professorial appointments made by them. The Medical Faculty elected the Dean of the School, arranged the lectures and other exercises, collected the fees, paid expenses, and divided the surplus, if any there were, among themselves. President Eliot once referred to the Medical Faculty as 'a sort of trading corporation as well as a body of teachers.' Medical students bought tickets to the courses of lectures, as they would for a series of concerts. They were supposed to attend five or six lectures a day, and the same lectures were repeated year by year. To obtain a doctor's degree the student needed to pass only the majority of the formal examinations, and consequently might be profoundly ignorant of almost half of the subjects taught. In addition, he must present a certificate that he had studied medicine for at least three years with some regular practitioner, who might be a total stranger to all the Faculty. Further, the students to whom this deplorable system of instruction was applied were usually persons of scanty preliminary training. Very few were college graduates.

2. Reformation, 1869–83

Such, in brief, was the Harvard Medical School upon the advent of a new president of the University in 1869. Mr. Eliot gave the first hint of what was coming when he took the chair at a meeting of the Medical Faculty, as no president had ever done before. The crying need for a radical change from a proprietary to a university school, and also for the proper teaching of advancing science, had caught his ear. A majority of the professors were conservative, but a few allied themselves with the President. Chief of the progressives was James Clarke White (A.B. 1853), who already in 1866 had written an editorial in the Boston Medical and Surgical Journal, regarded as heresy by many of the Faculty, decrying the defects of medical education in America.[1]

The champion of the conservatives was Henry Jacob Bigelow (A.B. 1837). He it was who, at a later Faculty meeting, asked why so many changes were proposed, when everything in the School was prosperous and quiet.[2] For a moment there was a dead silence. Then President Eliot replied, with that peculiar firm softness which belonged to some of his utterances: 'I can tell Dr. Bigelow the reason; we have a new President.' Bigelow objected to the higher requirements for entrance to the School, advocated by the President, on the grounds that physicians and surgeons were born, not made, and that the inevitable reduction of numbers might exclude a genius in the art. He insisted that collateral sciences, which the student may or may not need, should not be confounded with the medical art, which he must have. He denied that great medical discoveries were made in the laboratories. Finally, when Mr. Eliot and his adherents had carried the battle to the Corporation, Dr. Bigelow exclaimed: 'Does the Corporation hold opinions on medical education? Who are the Corporation? Does Mr. Lowell know anything about medical education? or Reverend Putnam? Or Judge

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[1] Harrington, iii, 1403–04; Dr. White's *Sketches from my Life* (1914).

[2] *Memoir of Henry Jacob Bigelow* (Boston, 1900), p. 132.

Bigelow? Why, Mr. Crowninshield carries a horse-chestnut in his pocket to keep off rheumatism! Is the new medical education to be best directed by a man who carries horse-chestnuts in his pocket to cure rheumatism?'

We shall see that at a later date this same issue of submission to the governing boards of the University in purely medical matters almost caused the resignation of the entire Faculty; but in the present case the President, after a year of long discussion and heated argument, was able to obtain a vote from the Faculty initiating his new policies. In 1870 the old statutes relating to the Medical School were repealed, and new statutes placing the School on a strictly university basis were enacted. The finances of the School were put in the hands of the University treasurer, and the Faculty were voted salaries. The students were charged a yearly tuition fee of $200 (or $121 for the winter term, and $100 for the summer session). Oliver Wendell Holmes, then one of the Faculty, characteristically wrote to his friend, J. Lothrop Motley, 'Our new President, Eliot, has turned the whole University over like a flapjack. There never was such a bouleversement as that in our Medical Faculty.'

Mr. Eliot expressed his estimate of the result of this action in the following words:[1]

> It would be difficult to overstate the importance of the effort which this single School is making, with no support except the approval of the profession, to improve the system of medical instruction in the United States. The ignorance and general incompetency of the average graduate of American Medical Schools, at the time when he receives the degree which turns him loose upon the community, is something horrible to contemplate, considering the nature of a physician's functions and responsibilities. The early mistakes of a young lawyer or a young minister are no great matter; not much is staked upon his skill and wisdom, and the community does not suffer irremediable losses and multiplied miseries, if novices in these professions are left by the Schools in such a condition that they have to learn some pretty elementary lessons by practice. In the medical profession it is far otherwise. The mistakes of an ignorant or stupid young physician or surgeon mean poisoning, maiming, and killing, or, at the best, they mean failure to save life and health which might have been saved, and to prevent suffering which might have been prevented. . . . The Harvard Medical School has successfully begun a revolution in this system.

[1] President's *Report* for 1871–72 pp. 25–26.

To combat this evil state of affairs, Mr. Eliot proposed two remedies: to obtain a higher class of students, and to ensure that all their instruction should be under competent teachers. For the first purpose he advocated stiff entrance examinations, looking forward to the time when all medical students would be required to possess a bachelor's degree. On the side of instruction, the President's aim was to do away with the system of apprenticeship under all sorts of physicians, and to provide adequate teaching in all branches of medicine by professors of the School, chosen by the Faculty with the approval of the Corporation. For the so-called laboratory subjects or medical sciences such as anatomy and chemistry, the professor needed merely a laboratory and the proper equipment to realize this aim; but the more practical study of medicine and surgery could not be done properly without patients by whom to demonstrate the various diseases or accidents. In other words, the teachers in these subjects must also be members of a hospital staff; and only men so situated, chosen by boards of hospital trustees who had no connection with the University, could be considered as candidates for such positions in the School. Moreover, the arrangements of the hospitals frequently required the service of such men for only a few months of the year, which might not coincide with their duties as teachers. These conditions in the clinical subjects Mr. Eliot and the Medical Faculty set themselves to remedy, but the task was a long one. Of more immediate concern was the revolutionary growth and activity of the scientific branches.

The dissecting room is of course a laboratory, and was long the only one. There was also laboratory teaching, of a sort, in chemistry. But the new order was marked by the establishment in 1871, in three small rooms in the garret of the North Grove Street building, of the new Laboratory of Physiology, under Henry Pickering Bowditch (A.B. 1861),[1] and of that of Microscopic Anatomy, under Holmes. The Parkman Professorship of Anatomy and Physiology, then held by Holmes, who had been teaching both subjects, was, with his assent, divided so as to make a separate Department of Physiology, for which Bowditch was elected Assistant Professor. He was a young man of boundless enthusiasm, direct from studies with the great scientists of Europe, with no need or desire to practise medicine, ready and eager to devote his whole time to teaching and research. He was thus the first full-time professor at the Medical School; for although Holmes had long given up his medical practice, his time was chiefly given to literature. Bowditch was a great teacher, attracting students in such numbers that soon his two small garret rooms were badly overcrowded.

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[1] W. B. Cannon, 'Henry Pickering Bowditch, 1840–1911,' *Memoirs of the National Academy of Sciences*, xvii (1924), pp. 183–196.

The quality of the students steadily improved. In 1874 Dean Calvin Ellis (A.B. 1846) was able to report: 'Though two students were expelled for assault upon a member of the School, the qualifications and character of the body of students were higher than ever before, and the continued success of the new plan is most gratifying.' A few years later President Eliot wrote:[1]

> An American physician or surgeon may be, and often is, a coarse and uncultivated person, devoid of intellectual interests outside of his calling, and quite unable to either speak or write his mother tongue with accuracy. . . . In this University, until the reformation of the School in 1870–71, the medical students were noticeably inferior in bearing, manners, and discipline to the students of other departments; they are now indistinguishable from other students.

Meanwhile the methods of instruction in the School had undergone tremendous changes. The single course of lectures, repeated every year, had given place in 1871 to a graded course, leading the student step by step in medical knowledge, through three years of a study. Examinations in all courses must be satisfactorily passed. In 1868 the University Council of Great Britain had refused to recognize the medical degree of Harvard, as 'they recognized the degree of no college in which there was not a Professor of Physiology.' We have seen that this requisite was supplied in the School a few years later. In 1871 Mr. Eliot wrote: 'The University is determined to give all its degrees a serious meaning and a real value. College degrees have fallen into just disrepute in this country.' The Faculty wholeheartedly strove to help, in spite of loss of students and of receipts. The new type of teaching involved a monetary loss, for more instructors were necessary and more space and equipment for laboratories. Yet the Faculty persisted, appointing new teachers without raising the tuition fee. The result for a few years was that expenditures were greater than receipts; a subscription was started by some friends of the School to defray the deficit. Yet the Faculty even extended the original plans. In 1872 they voted to establish a graduate course, to provide the new instruction for those who were already practitioners; and in 1874 they suggested lengthening the course for the M.D. to four years.

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[1] *Report* for 1879–80, p. 33.

The hard times finally came to an end through an increase in the number of students, attracted by the newer teaching methods. From a low level of 170 students in 1872, numbers rose to 251 in 1879. At the same time the proportion of those who already had a bachelor's degree had markedly increased, and the number of students from outside New England had more than doubled. The Harvard experiment in medical education was a success, and was soon followed by the University of Pennsylvania and the University of Michigan. The Faculty even became a little proud. Dean Ellis, in 1878, reports: 'Some time since, an invitation was received to join the American Association of Medical Colleges, established to secure a greater uniformity in medical education; but, as the standard proposed was lower than that already adopted by the School, the invitation was declined.' The credit belongs to the Faculty as a whole, but in great part to the Dean. President Eliot wrote of Dr. Ellis, who resigned in 1883, only a year before his death, 'He actively furthered all the many improvements made by the Faculty during his long term of service, and the changes made in 1870–71 could not have been effected without his support.'[1]

The entrance examination was first held in 1877, and contrary to the fears of conservatives the reduction in the number of students was slight and temporary. The number steadily increased and the building became overcrowded. Also the new Boston City Hospital, opened in 1864, in quite another part of the city, offered important possibilities for clinical teaching. These had already been recognized during the deanship (1864–69) of George Cheyne Shattuck (A.B. 1831) by the appointment to teaching positions in the School of the Hospital's two leaders, David Williams Cheever (A.B. 1852) and Charles Edward Buckingham (A.B. 1840).[2] With these new clinical facilities, it was

[1] See *Memorials of Calvin Ellis* (14 pp., Cambridge, 1884), and Harrington, ii, 902–910.

[2] For memoirs of these three, see *American Medical Biographies* (1920), pp. 212–214, 1040; *Surgery, Gynaecology and Obstetrics*, xlvi (1928), 139–144; Harrington, ii, 867.

no longer imperative that the School should be near the Massachusetts General Hospital. One result of all these changes was a movement, first agitated in 1874, to erect a new School building halfway between the two major hospitals, at the corner of Boylston and Exeter Streets, where it was fondly supposed there would be ample room for expansion.

3. The Boylston Street School, 1883–1906

The task of raising money for a new building was great. The Corporation had no funds to appropriate to the use of the Medical School, and at that time the public was not in the habit of giving for such purposes. Gifts of any sort to the School were rare. In these days of huge donations the following item from the annual report of Dean Ellis for 1876–77 is enlightening: 'Two valuable donations have been received, — one of a microscope, from Arthur Chadwick Howard; the other of a skull, from Dr. G. S. Jones.' Sums of money were occasionally offered for specific purposes, but such gifts to the School were almost entirely due to the influence of individual physicians. As Mr. Eliot explained in one of his reports: 'So long as medical schools are conducted as private ventures for the benefit of a few physicians and surgeons who have united to form a corporation or faculty, the community ought not to endow them.' It was necessary for the Faculty to convince the public that Harvard was no longer a proprietary school, had 'ceased to be in any sense a private venture, and become a constituent department of the University, devoted, like other departments, to the advancement of science and learning,' and therefore worthy of aid. They succeeded, but slowly. In 1874 a 'meeting of persons interested in the erection of a new building for the Harvard Medical School' was held in Lower Horticultural Hall, to consider the best method of obtaining money. Addresses were made by President Eliot, Edward H. Clarke (A.B. 1841), Holmes, and Rev. Edward Everett Hale. A large committee of doctors and laymen was appointed to raise the sum of $200,000, but the aftermath of the money panic of 1873 seriously interfered with the project. Another appeal was sent out in 1881, signed by Eliot, Holmes, and Bigelow, who had been completely converted to the new education. This time the appeal was successful. The new building, considered a marvel of completeness and amply

DAVID WILLIAMS CHEEVER

1831-1915

HENRY PICKERING BOWDITCH

spacious for years to come, was first occupied in the fall of 1883, and the occasion was observed with elaborate exercises as marking also the hundredth anniversary of the founding of the School.[1]

Henry P. Bowditch was appointed Dean by the Corporation in 1883. Here, indeed, was an innovation which showed the trend of the times. Never before had the Medical School been guided by one who was not a recognized leader among the medical or surgical practitioners of Boston, by one whose interests centred chiefly in the laboratories and in new methods for the investigation of the causes and processes involved in disease, as opposed to the treatment and cure of the patient. The Faculty, confident in the proved success of the new ideas, and already feeling the benefits to medical practice of scientific investigation, willingly seconded the efforts of the new Dean. A pathological laboratory was established, and later, in 1885, Harold C. Ernst (A.B. 1876) was appointed Demonstrator of the new science of bacteriology.[2] In both of these subjects Harvard was the first school in America to give formal instruction. Histology, which had been taught by Holmes in one of the North Grove Street attic laboratories called the 'microscope-room' in those days, was expanded to include embryology, under the charge of Charles Sedgwick Minot (S.D. 1878).[3] In surgery and medicine the clinical teaching of small groups of students at the bedside became an important feature as a supplement to the more formal lectures to the whole class. In recognition of this type of teaching, clinical professorships were established, and in 1887 Charles Burnham Porter (A.B. 1862)[4] was appointed the first Professor of Clinical Surgery. This innovation had one great advantage, as is shown in this instance. Cheever, then Professor of Surgery in the School, was connected with the Boston City Hospital, while Porter was in control at the Massachusetts General Hospital. The valuable facilities of both hospitals were thereby secured to the students.

One of Mr. Eliot's most valuable contributions to the College was the extension of the elective system. For some time the

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[1] *Addresses and Exercises at the One Hundredth Anniversary of the Foundation of the Medical School of Harvard University*, October 17, 1883 (Cambridge, 1884).

[2] *Boston Medical and Surgical Journal*, clxxxvii (1922), 424.

[3] Memoir by F. T. Lewis, in *Anatomical Record*, x (1916), 133–164.

[4] *Surg., Gyn. and Obstet.*, xlvii (1928), 128–130; *Boston Med. and Surg. Jour.*, clx (1909), 696.

Medical School had also offered elective courses, usually of an advanced order, in addition to the regular instruction. They were given both as summer courses and as a programme for an optional fourth year of study. Now they were offered in increasing number; and, to ensure adequate teaching, new positions were created and new names yearly added to the teaching force. Rules had to be made defining which of these positions carried a seat on the Faculty. The salary list increased, even though the individual salaries were often pitifully small. The School again began to fear a deficit. But the new courses proved very popular, and the Faculty, emboldened by this fact and recognizing that the increasing number of students enrolled in the elective courses indicated an honest desire on their part for fuller knowledge, voted to make the fourth year a requisite for the degree. This period of time, exceeding as it does that required for the principal degree in any other graduate school of the University, was perhaps the logical sequel to the earlier requirement, before 1870, of one year in attendance at the School and a certificate of three years of apprenticeship. The change was to take effect for those entering the School in 1892.

Another advanced policy instituted during this period was the definite purpose of filling the chairs of the School with the best men obtainable for the positions, whether or not these were resident in Boston. The School was no longer to be a local or provincial institution. Thomas Dwight (A.B. 1866)[1] was appointed in 1883 to the Parkman Professorship of Anatomy, 'after careful inquiry had been made both in Europe and the United States for available candidates among anatomists of reputation'; and in 1892 the President reported: 'In appointing a professor of pathology, and an associate professor of physiology, the Corporation went outside of the ranks of the medical profession in eastern Massachusetts and sought the one at the Johns Hopkins Hospital, and the other at the University of Michigan.' These men were respectively William Thomas Councilman (M.D. Maryland 1878) and William Townsend Porter (M.D. St. Louis 1885). In 1894 Franz Pfaff (M.D. Strasburg 1892), who had studied and taught in Germany, Switzerland, Brazil, and England, was made Instructor in Physiological Chemistry, and later Professor.

This policy could not, however, be carried beyond the scientific or laboratory branches, for, as has already been explained, a clinical teacher is of value only as he can supply hospital facilities; and the Corporation thus found the field of candidates for clinical positions narrowed by the previous action of hospital trustees. The hospitals were beginning to recognize the advantage to themselves of opening their wards to the visits of students and instructors. Besides the Massachusetts General and the Boston City Hospitals, the Boston Dispensary, the Eye and Ear Infirmary, the Lying-In Hospital, the Free Hospital for Women, and the Children's Hospital were all available for instruction to Harvard students. Yet the fact that there was 'not a single hospital, infirmary, or dispensary over the appointments in which the School had the least control,' as was pointed out in the President's report for 1888, was considered a distinct disadvantage, and led in 1890 to a proposal to the Faculty that a hospital be established under the immediate control of the School. The motion was lost by an even vote. Three years later the Murdock Food Company offered its private hospital to the School for a term of years, but such a connection savored too much of commercialism, and the offer was not accepted. There seemed to be as yet no available means of attaining the desired result, but the matter was kept constantly before the Faculty.

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[1] Memoir by John Warren in *Anat. Rec.*, v (1911), 531-539.

Meanwhile, the growth of the School in the number of students and the increasing amount of space required by the greater number of subjects taught by laboratory methods, had already overcrowded the new buildings, which had been confidently deemed ample for at least forty years. In 1890 a large addition was provided through the generosity of a recent graduate, Henry Francis Sears (A.B. 1883), to be used for the laboratories of pathology and bacteriology. This addition relieved the pressure only temporarily. In 1895 a committee was appointed to raise money for an addition to the Sears Laboratory and for a new four-story building between it and the Public Library. Other and more ambitious plans superseded this.

For those unacquainted with modern medical instruction this constant need for more room may be difficult to understand. The Harvard Law School went through its early days in Dane Hall, which, even with its later addition, contained only ten rooms, three of which were used as offices by the three professors. In 1883 it moved to its new quarters in Austin Hall, a much smaller building than the new Boylston Street home of the Medical School, but apparently ample for the needs of the Law Faculty for many future years. Yet the Law School had in general more students than the Medical School. The difference in methods of instruction in the two Schools explains their different requirements of space. Law is taught by lectures and discussions, and by the study of books in the library. Large halls and space for the library are the main requisites. Research in law, a comparatively new development, requires merely a nook in a well-equipped library for its physical needs. The same might be said of the Business School. But in the medical instruction of the present day every student is encouraged to test for himself the facts set down in the textbooks, to study under the microscope the actual specimens, the recognition of which later may change the course of an operation or the treatment of a disease; to prove for himself the chemical or physical reactions which are taking place in the body, or the actions of the drugs he is later to dispense. All this takes time and also space, for the fittings and the sometimes elaborate apparatus of the laboratory for one type of study can seldom be used for another type. Rooms for technical preparation and mechanics' shops to make and repair apparatus are essential to the smooth running of a course. Individual rooms are needed for the professors and assistants, where they can carry on their researches undisturbed by the class, and accumulate or devise the apparatus they wish to use. And all this necessary space is in addition to the lecture rooms and the library, equally important for medical teaching and research. When it is considered that these additional demands followed rapidly, one after another, in the twenty or thirty years after 1869, as new subjects came to be recognized as insistently important, it is not so remarkable that buildings soon became inadequate, as that the Faculty and the medical profession could keep their heads above the flood tide.

During this period a number of the different branches of medicine and surgery had grown to such an extent as to require special instruction. This was at first given in the form of 'University Lectures' on special subjects, but in 1871 three new departments were launched as independent entities. Dermatology was placed under Dr. White, and thus Harvard became the first school in this country to recognize this specialty. The first Professor of Ophthalmology was Henry Willard Williams

(M.D. 1849),[1] and of Hygiene, George Derby (A.B. 1838). In 1888 four more professorships were established, raising the subjects formerly taught as part of general medicine or surgery to the dignity of distinct departments. Frederick Irving Knight (M.D. 1866)[2] was appointed in Laryngology, and William Henry Baker (M.D. 1872)[3] in Gynecology. In Otology, Clarence J. Blake (M.D. 1865)[4] became Professor and J. Orne Green (A.B. 1863)[5] Clinical Professor. The next five years saw the establishment of Departments of Histology and Embryology under Minot, of Orthopaedics under Edward Hickling Bradford (A.B. 1869),[6] of Pediatrics under Thomas Morgan Rotch (A.B. 1870)[7] and of Neurology under James Jackson Putnam (A.B. 1866).[8] Putnam had begun his special teaching in the Department of Medicine in 1874 under the curious title of Lecturer on the Application of Electricity in Nervous Diseases. In 1895 the Department of Bacteriology was created with Ernst, the pioneer in this field, as its head.

Some of these early teachers have since been honored by the endowment of professorships in their specialty. The Williams Professor of Ophthalmology, the W. H. Baker Professor of Gynaecology, the James Jackson Putnam Professor of Neurology, and the Thomas Morgan Rotch Professor of Pediatrics are the official titles of the present incumbents of the various chairs. The present head of the Department of Orthopaedics is the J. B. and Buckminster Brown Professor of Orthopaedic Surgery, a chair named for two Boston surgeons, the father (M.D. 1813) and the son (M.D. 1844), who did valuable clinical work in this specialty before the general recognition of its importance. In the older branches of medicine and surgery, also, some of the great names have been honored in the same way. The Parkman Professorship of Anatomy (the Hersey Professor ship is now held in Cambridge),[9] the Jackson Professorship of

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[1] Harrington, ii, 871–884.

[2] *Am. Med. Biog.*, pp. 671–672.

[3] *Ibid.*, p. 54.

[4] *Journal American Medical Association*, lxxii (1919), 512.

[5] *Boston Med. and Surg. Jour.*, clxxxvi (1922), 91.

[6] *Surg., Gyn. and Obstet.*, xlv (1927), 564–566; *Harv. Grad. Mag.*, xxxv (1926), 66–73.

[7] *Am. Med. Biog.*, p. 1003.

[8] *Ibid.*, pp. 947–949.

[9] The original Hersey Professorship of Anatomy and Surgery was established in 1782 and received its endowment and title in 1791. The chair was held in turn by the two elder Warrens until 1847. At that date the title was changed by the omission of the words 'and Surgery,' and this new professorship was given to Jeffries Wyman for the use of the Department of Comparative Anatomy in Cambridge. In 1866 the School

Clinical Medicine, the Shattuck Professorship of Pathological Anatomy, and the John Homans Professorship of Surgery, all tend to keep alive the memory of the early days and add to the historical background of the School.

Toward the end of the period in the Boylston Street building, President Eliot had become interested in the relation of insects and animals to human disease, and in the study of comparative medicine. In 1896 he announced the establishment of the George Fabyan Professorship of Comparative Pathology, endowed by a prominent Boston merchant, to which was appointed Theobald Smith (M.D. Albany Med. Coll. 1883); and in 1902 the James Stillman Professorship of Comparative Anatomy was founded, with Minot as the first incumbent. Two more chairs of this type were added later, that of Comparative Physiology, under W. T. Porter, and that of Biological Chemistry, under Otto Folin (PH.D. Chicago 1898). The latter soon became an endowed chair named for Hamilton Kuhn (A.B. 1887).

In addition to these new departments within its own precincts, the Medical School had a fatherly interest in the Dental School and the Veterinary School. The latter came into existence at the instigation of the Medical Faculty, and might have been an integral part of the Medical School, but the Corporation preferred to establish it as a separate entity, in 1882. The Dental School, founded in 1867 as a separate department of the University, maintained an arrangement with the Medical School whereby its students attended some of the exercises with the medical students; but administratively it was an independent school. When the move into the new Boylston Street building left the old North Grove Street property vacant, the Medical School gave the use of it to the Dental School. This arrangement was only temporary, for within a few years the old building was sold to the Massachusetts General Hospital. This precipitated a discussion on the relation of the three schools interested in the different branches of the healing art, and led to a proposal from the Medical Faculty that they should be combined under one Faculty of Medicine, of which the Dean of the

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tried to regain the endowment from this fund 'which this Faculty have always maintained was intended for the Medical School rather than for the College,' and the Corporation voted that 'Professor Wyman be added to the Medical Faculty.' But the next appointment to the chair was again for use in the College. The second Hersey Professorship, that of the Theory and Practice of Physic, remains in the Medical School.

Medical School should be the head, while each School should otherwise preserve its identity and its own Dean and Faculty. This combination was effected in 1899.

The Medical School had from the first assumed the instruction of dental students in most of the basic scientific courses, and thus further increased the overcrowding of the laboratories. Within a few years it was found that, because of the differences in the entrance requirements then existing in the two Schools, the dental students were not properly equipped to follow the regular courses, and it became necessary to give them separate instruction, for which the Dental School paid a stipulated fee. The Dental School flourished under the new régime, but the Veterinary School languished in spite of the efforts of its Dean, Charles Parker Lyman, F.R.C.V.S., and was finally dissolved in 1901.

4. The Move to Longwood Avenue

The sum of all these activities of the School and the increasing number of students and teachers made the acquisition of larger buildings imperative; but, as before the move to Boylston Street, the School could not meet the cost. True, a considerable fund left by Calvin Ellis and his sister Lucy had recently accrued to the School on her death, and also the University had in 1898 assigned some of its unrestricted funds, the Pierce bequest, to be used for medical purposes, thus for the first time recognizing the Medical School as financially an integral part of the University. But the proposal for the new buildings involved a much more elaborate project than ever before. It included the purchase of a large tract of land and the erection both of greatly enlarged school buildings and of a fully equipped general hospital, in which the School should have the right of appointment to the higher positions. The hope was that other hospitals would later locate on the land, and thus build up a great medical centre.

The proposers of this ambitious plan were Bowditch and John Collins Warren (A.B. 1863),[1] the great-grandson of the first professor in the School. Bowditch had resigned from the position of Dean in 1893, to be followed by William Lambert Richardson (A.B. 1864), but still remained the Professor of

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[1] 'The Warrens in Medical Boston,' *New England Journal of Medicine*, cxcix (1928), 245; and cc (1929), 863–864.

Physiology; Warren was the Moseley Professor of Surgery. Both were at an age when the visions of the young and the dreams of the old combine, and both abounded in faith. This time there was no public meeting, with set speeches by prominent men, to launch the scheme. President Eliot and several members of the Corporation and professors of the Medical School met at Warren's house on Beacon Hill, to discuss the proposition informally. The discrepancy between a relatively empty treasury and a plan calling for millions of dollars was apparent to all, and President Eliot was not too sanguine. But the enthusiasm of Warren and Bowditch was infectious, and one circumstance especially raised the hope of the doubters. It was shown that the hospital might possibly be obtained by diplomacy.

Several years before, two brothers, Robert Breck and Peter Bent Brigham, had left funds which were to be accumulated for twenty-five years and then used for the erection and maintenance of two hospitals, one for chronic and the other for general cases, in Suffolk County. The time was about ripe, but the trustees of the Peter Bent Brigham Hospital were not yet appointed. If these future trustees could be persuaded of the advantages to their hospital of close affiliation with the Medical School, a great part of the financial burden would be lifted. It was decided to attempt to carry out the proposed plan. Henry Lee Higginson, then a Fellow of the Corporation, formed a syndicate to buy and hold the land for the Medical School. After considering several locations, the committee chose the Francis estate in Roxbury as the most favorable site.[1]

Plans for the new school, a group of five units, were shown by Warren and Bowditch to Mr. J. Pierpont Morgan, to whom they had been introduced by Robert Bacon. Shortly afterward Mr. Morgan sent from London a cablegram, which was read by President Eliot at commencement, 1900, offering to build the three central buildings in memory of his father, Junius Spencer Morgan, 'a native of Massachusetts, a merchant of Boston, afterwards a merchant of London.' Meanwhile John D. Rockefeller, Jr. was approached by his friend, William B. Coley

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[1] The geographical separation of the Medical School from the College is regretted keenly by many in the School. Had the Charles River dam existed in 1900, it is probable that the present site of the Business School, which is included in Suffolk County and thus meets the requirements of the Brigham will, would have been preferred by the committee.

(A.B. Yale 1884; M.D. 1888), and became sufficiently interested in the project to send his representative to Boston to make a thorough study of Harvard University and its Medical School. This study was embodied in a thirty-page report, which contained the significant phrase: 'I am satisfied that Harvard is an institution well qualified to manage a large Medical School and to do the best grade of work'; together with a statement from Dr. W. H. Welch of the Johns Hopkins Medical School that expansion of the Harvard School would help rather than interfere with the usefulness of the recently formed Rockefeller Institute. But the careful survey left Mr. Rockefeller doubtful whether the scientific work in the large buildings could be properly maintained, and he advised his father to give a large sum only if more money were raised for endowment. Warren and Bowditch again were successful in raising more than the required amount by obtaining a number of large and small gifts, including the promise of one of the remaining two buildings from Mrs. Collis P. Huntington, in memory of her husband. Thus the Rockefeller gift and the completion of the Medical School project were secured.

The new buildings were ready for occupancy in late September, 1906, and a special celebration of this important event in the history of the School was arranged for two consecutive days. The exercises of the first day were held in the open air on the terrace and quadrangle, with addresses by Warren, Dean Richardson, Dwight, and Frederick Cheever Shattuck (A.B. 1868). President Eliot pronounced the dedication in these words:

> I devote these buildings, and their successors in coming time, to the teaching of the medical and surgical arts which combat disease and death, alleviate injuries, and defend and assure private and public health, and to the pursuit of the biological and medical sciences on which depends all progress in the medical and surgical arts and in preventive medicine.
>
> I solemnly dedicate them to the service of individual man and of human society, and invoke upon them the favor of men and the blessing of God.

The exercises of the second day were held in Sanders Theatre, in order to emphasize the close University connection of the Medical School. Addresses were given by President Eliot and by Dr. Welch of Johns Hopkins, and honorary degrees were conferred. One of these, the degree of Doctor of Arts, was then conferred for the first time by Harvard, as a degree suitable for the architect of the new buildings, Charles A. Coolidge (A.B. 1881). Five degrees were given to foreign visitors, who added a note of colorful pageantry to the solemn occasion. With this dual celebration the largest and most complete group of medical school buildings then existing in this country was launched on its career of usefulness.

5. Growth, Activity, Service, 1906–18

Soon after the opening of the new buildings, William L. Richardson resigned, and was succeeded in 1908 as Dean of the Medical Faculty by Henry A. Christian (M.D. Johns Hopkins 1900), who at the same time became the Hersey Professor of the Theory and Practice of Physic. The selection to the position of Dean of the Medical School of one who in his early training had had no connection with Harvard University marked anew the intention of the authorities to free this institution from any suspicion of provincialism and make it broadly cosmopolitan. The first few years in the new buildings were not easy, because of the reduced income in fees, due to the small number of students. This was the result of the requirement in 1901 of the full bachelor's degree for entrance to the School, then being felt in full force. Also the Brigham Hospital was not yet built, though a part of the School land had been bought for the purpose in 1907. The students were far removed from the older hospitals, and had to spend an undue proportion of their time in transportation. To relieve this condition and permit of some clinical teaching in the immediate vicinity, an Out-Patient Department or clinic for ambulatory cases was established in 1909 in one of the School buildings, and continued until the new hospital was built.

The difficult days were soon past. Responding to the wise persuasions of Mr. Eliot, and of Mr. Lowell, who succeeded him as President of the University in 1909, the Trustees of the Peter Bent Brigham Hospital recognized the vital need of medical school affiliation to a progressive hospital, and entrusted the nomination of their chiefs of service to the Corporation of the University. As Mr. Lowell stated in his first annual Report:

> The relations between the Medical School and the Peter Bent Brigham Hospital have at last been placed upon a basis wholly satisfactory

to both institutions. The University has no desire to manage the Hospital, nor have the Trustees of the latter an ambition to manage the School. But it is essential to the efficiency of a Medical School that its clinical instructors should have positions in hospitals, and hence an eminent surgeon or physician cannot be called from a distance to a chair in the School unless he can be offered at the same time a clinic in a hospital. This is impossible unless the appointments in both institutions are made jointly. On the other hand, the Trustees of the Hospital believe that the welfare of their patients will be promoted by having at their disposal the scientific resources of a great school, and by the ability to call to their service the best man from any part of the country by a joint offer of a chair and a clinic. The two institutions are convinced, therefore, that the interests under their charge coincide, and can be attained only by an unbroken mutual understanding in the matter of appointments.

The first appointments were Christian as chief of the medical service of the hospital and Harvey W. Cushing (M.D. 1895) as chief of the surgical service, both also holding professorships in the School. These men were to hold continuous services instead of the interrupted services of a few months in each year then usual in most hospitals. The Massachusetts General Hospital had initiated this innovation in 1908, by appointing F. C. Shattuck, who also held the Jackson Professorship of Medicine in the School, to the first continuous service in its general wards. Other hospitals soon adopted similar relations with the School, the first of these being the Children's Hospital, and now the practice has become well-nigh universal for larger hospitals throughout the country. Thus one great teaching problem, which had been recognized as such from the beginning of Mr. Eliot's connection with the School, was solved by the completion of the Brigham Hospital in 1912.

Meanwhile two new departments were added to the School. In 1909 the Department of Preventive Medicine and Hygiene was established with Milton J. Rosenau (M.D. Pennsylvania 1889)[1] in the chair. During the year this department showed its activity by coöperating with the State Board of Health in its investigations upon infantile paralysis, then at the height of its epidemic in this vicinity, and by suggesting that the Faculty be empowered to confer a new degree, that of Doctor of Public Health. In 1913, by combining this department with that of

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[1] Former Director of the Hygienic Laboratory of the United States Public Health and Marine Hospital Service at Washington.

Sanitary Engineering in the Harvard Graduate Schools of Applied Science and the Department of Biology in the Massachusetts Institute of Technology, a new School for Health Officers was organized, with Rosenau as Director and William T. Sedgwick of the Institute as Chairman of the Administrative Board. This combination between Technology and Harvard was a part of President Lowell's plan for the use of the Gordon McKay bequest, and it was hoped that this form of coöperation might be further extended in the future. When, however, the courts decided against the use of the fund for purposes of this sort, the School for Health Officers found a place in the newer School of Public Health.[1]

In 1909 also the Department of Neuropathology was recognized as independent, and the Professorship, endowed in memory of William Storey Bullard, was filled by the appointment of Elmer Ernest Southard (A.B. 1897). To his zeal the School owes the erection of the Boston Psychopathic Hospital in its present neighboring location, with the consequent ease of demonstrating mental disorders. His death in 1920, at the beginning of a promising career, was a great misfortune to that branch of medicine, and was deeply regretted by his colleagues.[2]

The Children's Hospital and the Collis P. Huntington Memorial Hospital were erected in 1910–11 on land bought from the School. The Huntington grew out of a bequest of Mrs. Caroline Brewer Croft for the study of cancer, in consequence of which the Harvard Cancer Commission was formed in 1899, with J. C. Warren as a member. Work was carried on in the laboratories of the School until Mrs. Huntington gave a large sum for a hospital, of which the Warren Laboratory is an integral part. The Cancer Commission is not organically a part of the Medical School, but is so closely affiliated as to be practically inseparable. Another offshoot of the School, without official connection with the University, was the Harvard Medical School of China, conceived by a group of medical students and incorporated in 1911 with Mr. Eliot and other members of the Harvard Corporation on the board. The School was opened in Shanghai as a five-year experiment, and in the spring of 1916 was taken over by the China Medical Board of the Rockefeller Foundation.

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[1] See Dean Edsall's chapter on the School, page 603, below.

[2] Myrtelle M. Canavan, *Elmer Ernest Southard and his Parents. A brain study* (Cambridge, 1925).

One event of importance in this period was the reorganization of the graduate and summer courses under the title of the Graduate School of Medicine. Courses outside the regular curriculum, and especially designed for medical graduates, had been offered in the Medical School since 1872, and summer courses for both medical students and medical graduates, since 1888. The courses became so popular that in 1909 the administration of the Harvard Summer School of Medicine was placed in the hands of a Director, assisted by a special committee; and two years later the separate Graduate School of Medicine, with Horace D. Arnold (A.B. 1885) as Dean, was established by the Corporation, under the general supervision of the Faculty of Medicine. In 1919 the Graduate School of Medicine was merged again with the Medical School, and put in charge of an Assistant Dean of Graduate Courses, in the hope that by reunion the problem of postgraduate medical teaching could be settled to better advantage.

Dr. Christian resigned his position as Dean of the Medical School in 1912 to devote his energies to his new duties in the Brigham Hospital. The new Dean was Bradford, the first Professor of Orthopaedic Surgery. Under his influence and largely through the efforts of F. C. Shattuck, the School of Tropical Medicine, the first of its kind in America, was established as a department of the Medical School in 1913. This branch of medicine had been intensively taught at Liverpool, London, and Hamburg, but disregarded in this country. Economic and political expansion, however, were bringing more and more Americans into actual contact with equatorial regions, and the inherent diseases of the tropics became vital to this nation as never before. The establishment of this School was furthered by the opportunity to secure the services of Richard Pearson Strong (M.D. Johns Hopkins 1897), Surgeon, U. S. A., whose experiences in the Far East had made him preëminent in this line. Later the United Fruit Company, recognizing the value of this department to their large enterprises in the tropics, appointed Strong the director of all of their medical undertakings, and thus opened a wide field for the practical instruction of students. Very fittingly Shattuck's son, George C. Shattuck (A.B. 1901) was appointed in 1921 Assistant Professor of Tropical Medicine. Recently this School has properly been merged in the new School of Public Health.

The World War gave the Medical School other opportunities for service. Late in 1914 the Medical Board of the *Ambulance Américaine* proposed to certain American university medical schools that groups of surgeons and nurses be sent over to engage in the work of their hospital, then at Neuilly-sur-Seine, for successive periods of three months. The first of these units was from the Lakeside Hospital of Western Reserve University, the second from the Harvard Medical School. This Harvard Unit, under Harvey Cushing, including many members of the Departments of Surgery and Orthopaedic Surgery, and Strong from the School of Tropical Medicine, took the service from April 1 to July 1, 1915. Dr. Strong, however, was soon detached to serve as chief of the Interallied Sanitary Commission to fight the epidemic of typhus in Serbia.

Another Harvard unit was the outcome of a proposal made by Sir William Osler through the British War Office to a number of American universities, that similar services of three months' duration should be undertaken in British war hospitals. The Harvard contingent sailed in June of the same year, and, under Sir Arthur Perry as commanding officer, was put in charge of No. 22 General Hospital at Camiers, near Boulogne. Under a succession of different leaders and without aid from other American universities, this unit continued in service throughout the war. Edward H. Nichols (A.B. 1886),[1] who led the first contingent with Roger I. Lee (A.B. 1902) as chief of the medical service, was followed by William E. Faulkner (A.B. 1887), David Cheever (A.B. 1897), Daniel Fiske Jones (A.B. 1892), and Hugh Cabot (A.B. 1894), who finally made arrangements by which the unit became an integral part of the Royal Army Medical Corps.

Later, when America entered the war, Harvard formed American Base Hospital No. 5. This was one of the three supplied by the Massachusetts General, Boston City, and Brigham Hospitals, all of which contained Harvard graduates; but the Brigham Hospital had especially desired to be affiliated with the Medical School as the Harvard Unit, and many of those who had served for a period in the two former units joined this new group, of which Cushing again was the leader. This was the organization which, in the early days of preparedness, volunteered to set up their hospital, tents, beds, and complete equipment, on

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[1] *Boston Med. and Surg. Jour.*, clxxxvii (1922), 45.

Boston Common, partly as an aid to patriotic enthusiasm and partly to care for the sufferers from the epidemic of infantile paralysis which was then sweeping the city. The actual participation of America in the war prevented the carrying out of this scheme; the unit sailed for France in early May, 1917.

In addition to these various units, the further history of which is told elsewhere,[1] many individuals from the Medical School were prominent in war activities. Strong's special mission to Serbia has been mentioned. W. T. Porter, Professor of Comparative Physiology, was sent abroad by the courtesy of the French Government at the request of the Rockefeller Foundation to investigate surgical shock, which played so large a part in the results of war wounds. Later Walter Bradford Cannon (A.B. 1896), George Higginson Professor of Physiology, was detached from Base Hospital No. 5 to serve successively as a member of the English Committee on Shock, as director of the Physiological Laboratory of the American forces, and as a member of the Interallied Conference on Gas Warfare, and finally was stationed at the Central Medical Department Laboratory, at Dijon, in charge of the Laboratory for Surgical Research. Robert Williamson Lovett (A.B. 1881)[2] was assigned by the government to give special courses of instruction in orthopaedic surgery to detachments of junior army medical officers, in preparation for reconstruction work among the wounded. Others joined the regular army or navy or the Red Cross. When finally the call of the draft was announced there were few indeed of the teaching staff who could not be truly accredited as necessary for the continuance of the School.

That the School should continue to prepare students for practice, and especially for practice in the army and navy, there was little doubt in the minds of the government. A provision of the draft laws permitted and encouraged medical students to continue their studies until graduation as members of the army detached for special service. The government also requested that these men be hurried through the course as rapidly as possible, and some of them forewent the summer vacations to graduate the earlier. For the depleted teaching staff this was an added burden cheerfully assumed. So far as possible, the School continued to function normally.

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[1] *The Story of the United States Army Base Hsopital No. 5*, by a member of the unit (University Press, 1919); Elliott C. Cutler, *Journal of the Harvard Medical School Unit to the American Ambulance Hospital in Paris* (New York, 1916).

[2] *Journal of Bone and Joint Surgery*, vi (1924), 757–759; *Boston Med. and Surg. Jour.*, cxcii (1925), 374.

During the war period two further medical activities were undertaken by members of the School. The first was the Harvard Infantile Paralysis Commission, formed by the Corporation in 1916 to further the knowledge of the disease then epidemic in Boston. It has since become a valuable agent for the State Board of Health. The second activity led to the formation of the Department of Industrial Hygiene. F. C. Shattuck again was the leading mind in the campaign which contemplated the study of industrial diseases through the financial help of the industries themselves. No such teaching or study then existed in the United States; but the idea that the human and material resources of the Medical School might be turned to solving some of the health problems of industrial workers, and thus improve working conditions, made a wide appeal. A group of department-store executives, mostly of Boston, supplied funds for a six-year programme. Before that period had elapsed these courses were absorbed into the School of Public Health. They had barely started when Bradford resigned as Dean in 1917.

6. Renaissance, 1918–29

The Harvard Medical School may be said to have been born of the Revolutionary War, for it was the fervor of those who had served as war surgeons that led to its establishment. Similarly the World War brought on a rebirth of the School. When peace was concluded, the School was having a hard struggle for existence. Many of the professors and other teachers were still absent on military duties, teaching was being carried on under difficulties, and investigation, except on subjects connected with the war, was almost at a standstill. The very size and completeness of the new buildings were in a sense a disadvantage. Costs of all sorts had very greatly increased, and as the resources of the School had had previously only a narrow margin of safety for essential activities, the new scale put it in a precarious financial condition. On their return to duty the teachers found themselves much hampered by lack of funds to carry on research. Strong efforts were made at this time by a number of other schools to take away many of the most able professors by offerings much larger salaries than Harvard could afford, and far better facilities for research. 'Potentially, then, the School was in a position to do the finest type of work in teaching and in advancing knowledge. In fact, it was . . . quite uncertain whether it would not go downhill rather than forward.'

So wrote the present Dean of the Medical School in his report for 1927–28, reviewing the last ten years. David Linn Edsall (M.D. Pennsylvania 1893) succeeded Bradford in 1918. Six years earlier he had been appointed to the Jackson Professorship of Medicine left vacant by the resignation of F. C. Shattuck, and carrying with it the chief medical service of the Massachusetts General Hospital. The new Dean determined that the School should go forward, and immediately set about obtaining new funds for endowment. Almost within the year success crowned his efforts. The DeLamar bequest, by far the largest individual fund that the School had ever had, became available in 1919–20.[1] The money subscribed yearly for teaching and research in industrial medical problems, of which mention has been made before, continued to pour in. Other sums were later donated for the special development of psychiatry, neurology, ophthalmology, and for the School of Public Health. The funds of the Medical School have increased in these ten years from $4,300,000 to just under $14,000,000.

Within the decade covered by this interesting report, which reads almost like a fairy-story, the rebirth of the School has been accomplished. It can stand on its feet financially, though, like all scientific institutions it will always be poor because there is always more to be accomplished. 'These figures as to money,' writes Dean Edsall, 'are, of course, interesting chiefly in relation to what they have made it possible for the Faculties in the two Schools to do.' The use of the dual term needs explanation and records one of the chief developments referred to.

It will be remembered that a School for Health Officers had been established by a combination of the facilities offered by Harvard and the Institute of Technology, and that during the war courses in industrial hygiene were provided out of funds subscribed by various industrial corporations. These courses were organized into the Division of Industrial Hygiene in 1918. Both activities, together with the School of Tropical Medicine, were grouped to form a new Harvard School of Public Health, largely endowed by the Rockefeller Foundation. The history of this School is given elsewhere in this volume. Its influence on the Medical School through Dean Edsall — Dean of both Schools — has been very helpful in supplying with additional funds some of the departments whose teaching extends to the students in both Schools, and in many other ways.

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[1] The bequest of Joseph R. DeLamar, in 1919, gave to Harvard College for the use of the Medical School the sum of $2,000,000 'to provide for the study and teaching of the origin and cause of human disease and the prevention thereof, and for the study and teaching of dietetics and of the effect of different food and diets on the human system and how to conserve health by proper food and diet.' This fund was considerably increased by subsequent payments.

The burden of administering two Schools was so great that in 1923 Edsall wisely resigned his position as Jackson Professor of Medicine, to be followed in that chair by J. Howard Means (A.B. 1907). He also obtained the appointment of an Assistant Dean to aid him in the necessary routine of the School office. With this relief from other duties and with the increased financial opportunities for expansion, the Dean was able to improve conditions in many of the existing departments of the Medical School. Charles MacFie Campbell (M.D. Edinburgh 1911) was in 1920 appointed Professor of Psychiatry, and at the same time, through the generous coöperation of the State authorities, Director of the Psychopathic Hospital, where Southard had previously been merely an honored guest. A new Department of Physical Chemistry in its relation to medical problems was created, with Lawrence J. Henderson (A.B. 1898) as its head. Improvements were made in the relations of the School with the Children's and Infants' Hospitals, with the Lying-In Hospital, which had recently joined the group of buildings clustered around the School, and with the Eye and Ear Infirmary. Now nearly all the Boston hospitals in which teaching is carried on are in academic relation with the Medical School.

In another direction Edsall has been particularly active. Many of the recent advances in teaching methods were carried out during his administration, and from his position as a member of the Commission on Medical Education, originated by the Association of American Medical Colleges, he has been able to guide the trend of medical education in the country at large as well as in this School. Freedom of the individual student, and the desirability of helping the exceptionally gifted student to a higher plane of knowledge, appear to be his guiding principles; principles evolved from a long series of educational experiments carried on by the School in its relations with the students.

7. The School and the Student

The first function of a medical school is to instruct students and fit them for the practice of medicine and surgery. The best schools will not be satisfied unless every succeeding generation of practitioners is superior to those that went before. To this end the Harvard Medical School has aimed at constant improvement, first, in the quality of the students whom it admits, and second, in the quality of instruction afforded them.

In the early days of Mr. Eliot's presidency and even at the time of the opening of the Boylston Street building, the Harvard Medical School was torn between its desire to better the class of entrants and the need for sufficient fees to carry on the work of the School. Oliver Wendell Holmes wrote in 1883: 'A school which depends for its existence on the number of its students cannot be expected to commit suicide in order to satisfy an ideal demand for perfection.' But he admits that 'a small number of thoroughly accomplished medical graduates . . . will be worth more to the country than twice or thrice the number of half taught, hastily taught practitioners.'[1] As the generosity of the public to the School increased, it became less and less dependent on students' fees. Hence requirements for admission were gradually raised, until in 1901 the possession of a bachelor's degree in arts or sciences was stipulated. The year before this requirement went into effect brought the largest entering class in the history of the School, one hundred and ninety-eight students. The next year there were only sixty-seven, but the drop was only temporary.

This degree requirement, however, unexpectedly caused an anomalous condition. In many of the western colleges a 'combined degree' was given, the first two years of medical studies being counted toward the bachelor's degree. Harvard did not allow this practice, on the ground that the two years would thus be counted twice, once for the first degree and again for the doctorate. In fact, a proposition from the Medical Faculty to 'telescope' the two degrees had been definitely rejected by the Corporation as far back as 1873. Hence a western college graduate who had had only two years of liberal education, could enter the third year of the Medical School and gain two years on a Harvard, Yale, or Princeton graduate. In 1909 the prerequisite for admission to the Medical School was so modified as to admit those with at least two years' college training, provided that they were especially good students, and that their college work had included certain specified courses in the fundamental sciences. Many thought this a backward step; the University Council, an infrequently convoked body including members of all the Faculties of the University, protested; but soon the increasing number of applicants supplied the cure.

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[1] *Addresses and Exercises at the One Hundredth Anniversary of the Foundation of the Medical School* (Cambridge, 1884), pp. 53–54.

In 1914, it was decided to limit the number of those entering the School, as it was found that the individual instruction inevitably degenerated when the classes grew above a certain number. Some of the older men connected with the School and with the University looked with distinct disapproval on this proposition, an innovation at Harvard. There was talk of the moral obligation to teach all qualified students who applied, and a threat that the Commonwealth would develop a new medical school, supported by the taxpayers, to care for its unfortunate sons who had been refused by Harvard. The wiser point of view prevailed, however, that the Medical School would do far better to supply the community with a restricted group of the highest training, rather than with a larger number of lower grade.

The limit was placed at one hundred and twenty-five men for each class, and was later increased by ten for the last two years of the course, when the students were attending the hospitals. This provided a few places in the third and fourth years for excellent men who had started their studies in the so-called 'two-year medical schools,' those without hospital facilities. From the large number of applicants, often three or four times as many as can be accommodated, the entering classes are chosen by a committee of the Faculty, which considers all the information available about the individual as well as his college grades. With such competition it is seldom that the successful applicant is not the holder of a bachelor's degree, though such cases do occur. Several years later the College found it necessary to follow the precedent of limitation set by the Medical School.

The studies followed in the School have undergone continual change. The four months' course of lectures, which was all that was required in 1869, expanded rapidly to one of three years (1871); then an optional fourth year was added. For a few years the doctor's degree could be obtained either by three or by four years' study, the students choosing on entrance which of the two courses they would pursue. Finally, in 1892, all were required to take the longer course. But the science of medicine was always expanding, and each instructor desired to impart to his students what he considered an adequate knowledge of his subject. To the existing lectures was added the more time-consuming laboratory work, and soon the four-year curriculum was badly overcrowded. The suggestion that a fifth year be added was never seriously considered, however, as all saw the disadvantage of prolonging the period, already too long, before medical student became practitioner. Instead, some of the more elementary subjects were thrown back into the College. In 1907 organic chemistry, which used to be taught in the School, was added to inorganic chemistry as a prerequisite for medical study; and in 1909 college courses in biology and physics were also required before admission to the School, so that the elements of anatomy and physiology need no longer take up the time of medical students. At first these subjects were strictly required only for those entering as special students without the degree, but later (1914) they were made compulsory for all. Time was thus saved for the purely medical studies, but the relief was temporary, since the limit to this procedure was soon reached. Medical subjects could not rightly be made premedical, and if premedical studies were allowed to eat too much into the college student's time, the whole object of the bachelor's degree stipulation — a wide education for future physicians — would be defeated. When this limit was reached the curriculum again began to be crowded.

An important change was made in 1909 by the introduction of the 'block system.' The students in the first two years had formerly been taught the basic medical subjects of anatomy, histology, physiology, physiological chemistry, pathology, and bacteriology by lectures and laboratory periods arranged with little sequence and largely by chance. An exercise on anatomy might be followed by one on bacteriology, and that by one on chemistry, entirely unrelated subjects. By the new plan the student spends all his time during his first half-year in the study of the normal structure of the body; in his second half-year in the study of normal function, and passes on in his second year to the study of the processes of disease and their action on the patient. Two objects are gained: he can spend long periods on one phase of his medical education without interruption, and he can utilize the knowledge he has gained in one subject in his study of the next. Mr. Eliot was much interested in this new method of massed instruction, and suggested that it might be of interest in other departments of the University. But it proved open to certain objections.

American university education has long differed from that of Europe in the method by which the student's knowledge is evaluated. Generally speaking, the European student at the end of his period of preparation for a degree is examined comprehensively on one broad subject, and doctors, in whatever field of knowledge, are commonly required to submit a written thesis embodying original research.[1] In America, from the establishment of the elective system until recently, the sum or average of the grades obtained in a required number of courses was the sole basis on which degrees were awarded.[2] At the time of graduation the student might have forgotten much of the matter contained in a course passed with credit in his first year. This was especially unfortunate in the study of medicine, where the knowledge of the normal structure and function of the body and of the general principles of disease, gained in the first two years, is necessary for the full understanding of the diseases studied later. The block system, where each subject was treated intensively for a period and then dropped entirely, served to increase the students' tendency to treat each course as an entity, to be passed, stored away, and forgotten.

The remedy for this unfortunate condition was sought in a general examination, after the European style, to be passed by all students before graduation. It was so voted by the Medical Faculty in 1911, at the recommendation of a committee which had studied carefully all phases of the subject. At first the innovation was not very successful, as the examination was so framed as to be merely a review of all the other courses, already passed, and an added burden to the student. The committee, however, has been kept in office and has steadily improved the type of examination. In 1925–26 its declared aim was 'to select questions which were designed in a broad way to test the ability of an individual to correlate his knowledge rather than to serve merely as a test of memory. Furthermore the scope of the questions was such as to require considerable judgment in selecting the proper aspect for emphasis.' Mr. Lowell comments on this: 'It would be hard to describe better the object and nature of a good examination.'[1] Now the general examination has been adopted in most of the departments of the College.

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[1] A thesis used to be required also for graduation from the Harvard Medical School, but was abolished in 1887, when Bowditch was Dean.

[2] See also chapters 2 and xxviii of this volume. The Harvard Ph.D. has always been awarded on the basis of a general examination and a thesis.

To help the student toward the proper point of view for such a correlation of his knowledge, a system of faculty advisers was instituted, and later a tutorial system, modified to fit the needs of the Medical School. Before this could be put into effect, however, a notable change in the curriculum was found necessary. The student whose whole time is crowded with required work has no leisure or ambition to think of the relation of one subject of instruction with another, and no opportunity to follow further any study in which he may become interested. The remedy was drastic. On the instigation of Dean Edsall the Faculty voted in 1921 to reduce by approximately one-quarter the required work and appointed time for each course, and to leave the students free to use as they chose the time thus saved. Their response to this 'gift of time' showed that the student body could be trusted to improve it. The use of the library doubled within a few years, many students enrolled in 'voluntary courses' of advanced instruction not counting toward the degree, and the results of the general examination were distinctly better.

A certain amount of freedom has long been permitted to the individual student by providing elective courses. At one period (1905–18) all fourth-year courses were elective; but this policy had to be abandoned, partly because the students did not show good judgment in their election, and partly because of new restrictions from outside the School. In 1910 the Carnegie Foundation for the Advancement of Teaching began an investigation of American medical schools in the attempt to eliminate those which were producing inferior practitioners. Roused by the results of this investigation, state licensing boards and medical organizations throughout the country proceeded to adopt certain requirements of equipment and curriculum in the schools. Any school which fell short of these standards found its graduates automatically disqualified for the state examination for license. Laudable as was the intention of these bodies, the ever-increasing stringency of the requirements and their varied character in different states soon made strict adherence to all the provisions very difficult, though necessary for the Harvard Medical School because of the wide geographical range of its students. The length, character, and even the sequence of many courses thus became rigidly prescribed, and elective courses were crowded out. There was danger that all medical schools and all students would be forced into one mould, and that individuality and initiative would be lost in the one as in the other. The relief came in 1922 when the Association of American Medical Colleges recommended that only minimum standards of general character should be imposed. The state boards, whose only aim was to follow the opinions and desires of medical educators, soon altered their rules, and at present the schools have ample freedom. With the free time now available for the individual student, and the many 'voluntary courses' open to him, the stated elective courses have been limited to one month in the fourth year. On the other hand permission is given to those under the tutorial system and to a few specially qualified students under certain conditions to substitute particular work, even in other institutions in this country or abroad, for the otherwise required courses counted toward the degree.

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[1] President's *Report* for 1925–26, p. 24.

Parallel with its constant endeavor to improve the quality of its students by advances in the methods of selection, of teaching, and of examining, the Faculty has, though very tardily it must be admitted, made similar progress in the care for their physical well-being. By its original move to Boston and later by its choice of the Francis estate for the present buildings, the School severed all geographical connection with the College, and practically forced its students to seek board and lodging for themselves. In the early days, when the great majority of the students were Boston men, this made little difference to them, and may even have been an advantage; but for the students from other parts of this country and from abroad, who came later in ever-increasing numbers, it was a distinct hardship, only slightly palliated by the growth of a few medical fraternities with their own houses. Financial aid was supplied to a minority of the students by means of scholarships, fellowships, and loans. D. W. Cheever, a masterly teacher beloved by all his students,

JOHN COLLINS WARREN

1842–1927

FREDERICK CHEEVER SHATTUCK

1847-1928

gave the first scholarship in 1889, and two years later three Bullard Fellowships followed. The number of these aids grew to such proportions that it was found necessary in 1910 to appoint Franklin Dexter (M.D. Columbia 1887) as Director of Scholarships. Recently a large revolving fund has been accumulated, largely through a gift from Dr. Fred Shattuck, to be used for loans to needy students. Yet little improvement of the students' living conditions could be accomplished by financial aid.

The evils of this situation were recognized by the authorities. In 1895 the President stated:[1]

> The lot of the poorer medical students would be much ameliorated if the School possessed one or more dormitories, and a dining-hall conducted on the principles of the Foxcroft Club at Cambridge. Medical students suffer more than any other class of students from unsanitary lodgings and poor food; because such bad conditions render them more liable to contract some of the contagious or epidemic diseases to which they are often exposed.

The subject was revived eight years later, when a dormitory was suggested as one of the new buildings. Again, in 1912, J. C. Warren appealed publicly for a dormitory in an article in the Boston Medical and Surgical Journal, an article strengthened by a letter signed by the presidents of the four classes then in the Medical School. Still nothing definite was accomplished until the Harvard Medical Alumni Association was roused to action by its President, Elliott Proctor Joslin (A.B. Yale 1890). Early in 1923 the Association sent out a call to the alumni, and to other medical practitioners, for money to build a Medical School Dormitory. The response was so favorable in numbers if not in amount, that the committee in charge felt encouraged to ask for a general subscription. Mr. Lowell from the first had been an enthusiastic supporter of the plan and in 1924 brought out clearly an added advantage which a dormitory would supply:[2]

> Such a building will not only improve greatly the condition of many students, but will furnish them with a well-nigh essential element in all professional education, the discussion among themselves of the sub-

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[1] President's *Report* for 1894–95, p. 28.

[2] President's *Report* for 1923–24, p. 17.

jects studied. One learns almost as much, or at least learns as retentively, by attrition with other students as from the words of the teacher. The project deserves the most earnest support.

The sum increased slowly for three years, when it was suddenly completed by a generous gift from Harold S. Vanderbilt (A.B. 1907), who had become interested in the project through his friend Elliott C. Cutler (A.B. 1909). Equally zealous for the physical welfare of the students, Mr. Vanderbilt provided for a gymnasium in the dormitory, and for the services of a physical instructor.

This provision added further impetus to a plan which had already been in the minds of the Faculty for some time. As it is expressed in the Acting Dean's Report for 1925–26, 'there is a challenging irony in a situation where men engaged in a study of conditions which produce disease and which are favorable to restoration of health become ill in the process.' Yet this was happening with alarming frequency in the School, and among the younger alumni. As a remedy for this condition the Faculty voted, in April, 1925, 'to require a yearly physical examination of all students in the Harvard Medical School.' The plan was put into effect the following fall with the coöperation of the Deaconess Hospital, and under the direction of Roger I. Lee, Oliver Professor of Hygiene in the University. At present the physical examination is not only a basis for personal advice in the matter of health, but a method of instruction, promising valuable results.

The new dormitory, Vanderbilt Hall, was opened in the fall of 1926, on land directly across the street from the Medical School. Already it has proved its value in offering attractive living and dining quarters and opportunity for exercise both to students and to young instructors, and in providing them with a place to discuss medical subjects among themselves and with older and wiser friends. In fact, the dormitory promises to be one of the most important educational agencies of the School.

The School does not offer the medical degree to women, though many women are admitted to the scientific courses as part of their preparation for higher degrees from Radcliffe, just as many men take courses in the Medical School when studying for the Ph.D. at the Graduate School of Arts and Sciences. From 1919 to 1925 Alice Hamilton (M.D. Michigan 1893), now connected with the School of Public Health, was a member of the Medical

Faculty as Assistant Professor of Industrial Medicine. The question of the admission of women on equal terms with men has been before the Faculty several times since 1847, and the arguments in the early years of Mr. Eliot's administration were particularly heated. The Faculty seems always to have been fairly evenly divided on the subject. On two separate occasions one or two women were actually enrolled in an entering class, although they subsequently withdrew, once as the result of a petition from the rest of the class, and once on the rumor of such a petition. In 1881 the Corporation accepted the report of a committee favoring the admission of women, and was only prevented from final action by a protest from the Medical Faculty, complaining that they had not been sufficiently consulted in the matter, and offering to resign in a body. One result of this affair was the appointment of a standing committee of the Corporation to confer in future with the Medical Faculty on matters of medical education.

During the World War the proposal to admit women, primarily to replace the many physicians absent on war duties, was again submitted. Investigation showed that there were less than twenty women candidates, that of those only one or two could fulfill the admission requirements, and that these had already arranged to take their medical training elsewhere. So the matter was dropped, and the Harvard Medical School remains a school for men.

8. Research, 1869–1929

To insure that the instruction given the students shall keep pace with the ever-advancing science of medicine, it is essential that the teachers constantly keep abreast of the times in their chosen fields; better still if they themselves are pioneers. Thus the second function of a medical school is to foster research and to train men to carry on investigation. We have not space to list, or to attempt to compute the value of, the work done in the various departments of this School, but mention of a few of the results of special interest to the public may perhaps be permitted.

In the early days, before the often misused word 'research' was at all familiar, Reginald Heber Fitz (A.B. 1864) first recognized and named the disease appendicitis (1886).[1] A decade later Ernst in the Department of Bacteriology devised and prepared the first 'baked' dressings, for the use of J. Collins Warren in his surgical cases at the Massachusetts General Hospital. He also first suggested the sterilization of milk for digestive disturbances in infants; and in the same laboratory John Hildreth McCollom (M.D. 1869) first determined the value of bacteriological examination of the throat in suspected cases of diphtheria (1894).[1] The use of the X-ray in the diagnosis of intestinal disorders resulted from experiments in Bowditch's laboratory by Cannon, then a first-year student in the School.

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[1] *Reginald Heber Fitz, 1843–1913. Memorial Addresses Delivered at the Harvard Medical School, November 17, 1913* (1914, privately printed).

Later, in conjunction with the Harvard Infantile Paralysis Commission, Lovett devised new methods of muscle training which have saved hundreds of the victims of this disease from permanent helplessness. Harris Peyton Mosher (A.B. 1892), in conjunction with his work on the oesophagus, has introduced as a practical measure the reduction of the thymus by X-rays preceding throat operations, thus apparently obviating the danger of 'thymus deaths.' More recently still, through the researches of George R. Minot (A.B. 1908), pernicious anaemia, one of the formerly incurable diseases, has been conquered by the discovery of the curative value of a liver diet.

Minot's discovery was based in large part on researches on the blood-forming organs, the bone marrow and the spleen, by Francis W. Peabody (A.B. 1903).[2] His contribution may be taken as an example of the greater part of medical investigation, not in itself the immediate means of alleviating suffering, but supplying facts to be used by others. Charles Sedgwick Minot, in the early days, succeeded in introducing to America the new science of embryology, and thus opened an additional method of attack on medical problems. Folin has turned the major energies of his department toward devising more accurate biochemical methods, and has thus changed the whole standard of this science. Frank Burr Mallory (A.B. 1886) was first known for the delicacy of the microscopical stains he developed. Henderson, by his new conceptions in physical chemistry, has influenced chemical thought throughout the country. In every laboratory important work is going on, and the subjects investigated are almost as numerous as the workers.

The amount of this type of activity in the School may be gauged by the fact that nearly sixty senior members of the staff are now engaged in serious investigation, and more than that number of younger men. About thirty research fellows, sent here by organizations in various parts of the world, have gathered in the laboratories for instruction and investigation. Many have already carried the spirit of research to other institutions, where they hold positions of responsibility.

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[1] *Boston Med. and Surg. Jour.*, clxxii (1915), 953.

[2] *Ibid.*, cxcvii (1928), 1288–92.

Two indispensable aids to teaching and research are a library and a museum. In both respects the School is particularly well equipped. Starting in the North Grove Street building as a handful of torn books, bought by the professors for the students' use, the library lagged for many years because of arrangements by which the Boston Medical Library opened its doors to students and teachers alike. The departments of the School soon found it convenient to have small libraries relating to their special subjects, and the present buildings were originally designed to accommodate departmental libraries. The duplication of books and journals which this imposed, and the inconvenience for those working in overlapping fields, led to the formation of a central library, including most of the departmental libraries, and situated in a room of the main building named for C. B. Porter. In 1928 it was combined with the library of the School of Public Health and moved to much larger rooms, with greatly increased stack area. It now contains more than 160,000 volumes and pamphlets.

The Warren Anatomical Museum was founded in the North Grove Street building by a gift of the elder J. C. Warren of specimens collected by him and his father, to be added to a small previous collection, for which there had been a curator, John Barnard Swett Jackson (A.B. 1825), since 1847. Under Jackson and under William Fiske Whitney (A.B. 1871),[1] who succeeded him in 1879, the museum grew until it now fills the whole upper floor of the present main building. Historically the collection is extremely interesting, and scientifically it has become of great value for teaching and research.

This is a narrative history of events, not of men; yet no history of the School is possible which does not at least mention the names of some of the great teachers of the past, who by their personalities added so much to its character. The Harvard Medical School is perhaps unique in the number of instances in which it has been served by successive generations within families. Four of the five generations of Warrens in direct line, four members of five generations of the Jacksons, and four of the Shattuck family from three generations, have had seats on the Faculty. Four successive generations of the Reynolds family have been connected with the School. Three families have been represented in three generations: White, Bowditch, and Bigelow. Four members within two generations are Maurice Howe Richardson (M.D. 1877),[1] his two sons, and his brother Oscar. Jeffries Wyman and his brother Morrill (both M.D. 1837) are followed by a grandson of the former;[2] Charles Pickering Putnam (A.B. 1865)[3] and his brother James Jackson Putnam by the former's son; and Samuel Jason Mixter (M.D. 1879)[4] by two sons. The list is long of those who have trained sons to support the School: Cheever, Fitch Edward Oliver (M.D. 1843),[5] John Homans (A.B. 1858),[6] Hasket Derby (M.D. 1858),[7] Oliver Fairfield Wadsworth (A.B. 1860),[8] Porter, Fitz, Baker, Charles Montraville Green (A.B. 1874),[9] John Baker Swift (M.D. 1877),[10] John Cummings Munro (A.B. 1881), Walter Lincoln Burrage (A.B. 1883), Paul Thorndike (A.B. 1884), Mallory, Fred Bates Lund (A.B. 1888), Joseph Lincoln Goodale (A.B. 1889), Edsall, all have or have had sons on the teaching or research staff. Arthur Tracy Cabot (A.B. 1872)[11] was followed by his younger cousins, Richard Clarke Cabot (A.B. 1889) and Hugh Cabot (A.B. 1894). The tide is still flowing, as almost every year some

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[1] *Boston Med. and Surg. Jour.*, clxxxiv (1921), 316.

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1. *Memorial to Maurice Howe Richardson, 1851–1912; Surg. Gyn. and Obstet.*, xlv (1927), 394–397.

2. Asa Gray, *Jeffries Wyman* (Memorial meeting of the Boston Society of Natural History, October 7, 1874); Morrill Wyman, Jr., *A Brief Record of the Lives and Writings of Rufus Wyman (1778–1842), and his son Morrill Wyman (1812–1903)* (Cambridge, 1913).

3. *Am. Med. Biog.*, p. 945; *Boston Med. and Surg. Jour.*, clxx (1914), 741.

4. *Surg. Gyn. and Obstet.*, xlv (1927), 714–716.

5. Edmund F. Slafter, *Memoir of Fitch Edward Oliver* (Boston, 1894).

6. *Surg. Gyn. and Obstet.*, xlv (1927), 844–848.

7. *Boston Med. and Surg. Jour.*, clxxi (1914), 471–472.

8. *Ibid.*, clxvi (1912), 529–532; *Transactions American Ophthalmological Society*, xiii (1912), 11–14.

9. *New England Jour. of Med.*, cxcix (1928), 1122.

10. *Boston Med. and Surg. Jour.*, clxix (1913), 333.

11. *Ibid.*, clxviii (1913), 409–415; memoir by F. C. Shattuck in *Proceedings American Academy Arts and Sciences*, liii (1918), 793–798.

son of one of the present or past teachers is enrolled in the School or knocking at its gates.

Graduates of the School will find many names missing from these pages. Often teachers by whom they were deeply influenced belonged rather to the hospitals than to the School, and played small part in its development. Two names must still be mentioned, however. Algernon Coolidge (A.B. 1881) and George Gray Sears (M.D. 1885) by their wise counsel have immeasurably aided the School through their long connections with the two great hospitals of Boston. Without their constant care the essential relations could hardly have been maintained, and the present harmony might have been impossible.

The sixty years from 1869 to 1929 have brought great changes in the Harvard Medical School. The little proprietary school, offering its share of academic instruction to young medical apprentices, has become a worthy part of a great university. The house on North Grove Street, nestling close to the Bulfinch dome of the Massachusetts General Hospital, to which students could walk through a gate in the old fence, has been superseded by five great buildings, surrounded by new hospitals, the whole forming an imposing medical group. The little Faculty of 1869, comprising so few members that it was called a 'dinner club,' has increased many fold. Yet the early Faculty members, could they sit at one of the present meetings, would recognize in the discussions, among a bewildering number of new terms and new ideas, the same ideals and principles which guided them in their own debates. The desire for improvement in the quality, rather than increase in the quantity, of students and graduates is reflected in the recent limitation of numbers and the introduction of the comprehensive examination before graduation, as truly as in the early requirement of a searching entrance examination and the later stipulation of the bachelor's degree. Could the old faculty members have listened to a recent lecture on the care of the patient, given shortly before his untimely death by Francis W. Peabody,[1] they would have known that the spirit of the elder Warren was still guiding the School toward the merciful relief of suffering and the conquest of disease. Cheever would have delighted in swelling the applause, or Fitz, or Shattuck. Most of those of the older generation were not scientific in the modern sense, but able teachers and beloved practitioners, old-fashioned perhaps, but ever willing to make changes for the benefit of the School. Their contribution was to establish traditions of service to patient and public. The zest for research, introduced by Bowditch, Minot, and Ernst, and the desire to make use in medicine of every new method known to science, have spread through all the many departments of the School. A few older graduates have thought that cold science might chill the warmth of human kindness. But of this there is little fear. The old traditions are still vital. Merged with the new scientific spirit they give the Harvard Medical School its present position and its hope for the future.

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[1] F. W. Peabody, *The Care of the Patient* (Harvard University Press, 1927).

XXXVI. THE DENTAL SCHOOL

1867–1929

By Leroy M. S. Miner, D.M.D.
Professor of Clinical Oral Surgery and *Dean of the School*

ON the 4th of March, 1864, a group of Boston dentists met for the purpose of organizing a dental society. Some of these dentists in active practice were graduates in medicine, others were graduates from dental colleges, but most of them had learned their profession through the preceptor system, a common method in those days both in medicine and in dentistry. The society thus formed was called the Massachusetts Dental Society and was incorporated March 30, 1865.

At the time there were in this country about seven dental schools, the nearest in Philadelphia. A frequent subject for discussion in those early meetings of the Massachusetts Dental Society was the desirability of having a dental school in Boston. Why should the young men of Boston, or of Massachusetts, or of New England, have to travel in order to get a collegiate training in dentistry?

Nathan Cooley Keep (M.D. 1827), President of the Massachusetts Dental Society, in his annual address of 1865 threw out the suggestion that Harvard University might appoint professors of dentistry and confer upon proper candidates the degree of Doctor of Dental Surgery. The Society then appointed a committee of three, Drs. Keep, I. J. Weatherbee, and Thomas H. Chandler, to take under advisement the president's recommendation. Not much progress was made during this first year, and in March, 1866, a new committee was created, consisting of Drs. Keep, E. C. Rolfe, and Luther D. Shepard, who were charged with the duty of conferring with the officers of the Harvard Medical School. The medical faculty in its turn appointed a committee: Drs. Henry I. Bowditch, Henry J. Bigelow, and Calvin Ellis. As a result of conferences between these two committees, a plan was presented to the medical faculty on March 29, 1867. It was supported by the faculty committee in the following words:

> Dentistry has become, within the last quarter of a century, a most important art, a knowledge of which supposes not only mechanical

> skill, but a thorough acquaintance with the processes of dentition, physiology, surgery, chemistry and materia medica, to which should be added some knowledge of the theory and the practice of medicine. A medical school already established is therefore the best place at which these various studies can be attended to. It is all important that the art should be cultivated by all the means in our power, in order that the dentists that will hereafter be in this city may not be of a lower quality than their predecessors. . . . With such facts and others that might be named, can there be any doubt that a dental college should be established in Boston?

To this report to the medical faculty the following resolution was appended:

> *Resolved*, That the Dean be directed to petition the Corporation of Harvard College to establish a dental school according to the terms proposed in the second report of the committee of the Massachusetts Dental Society.

The medical faculty unanimously adopted this resolution, and the President and Fellows of Harvard College, after full investigation, voted, on July 17, 1867, to establish the Dental School.[1] The governing boards decided that the dental faculty should consist of the Medical School professors of anatomy, physiology, chemistry, and surgery, and of three new professors of dental pathology and therapeutics, of operative dentistry, and of mechanical dentistry, who must be graduates in medicine. By this vote, Harvard was the first American university to establish a dental school.

The first appointments in the Dental School were made November 30, 1867, as follows: Daniel Harwood, Professor of Dental Pathology and Therapeutics; Nathan C. Keep, Professor of Mechanical Dentistry. At a meeting of the faculty in March, 1868, Dr. Keep was elected Dean. In June of the same year, Dr. Harwood, who held very strongly to the opinion that the dental student should be educated in medicine, and that training in dentistry should be given simply by adding a chair in dentistry in the Medical School, rather than by establishing a separate dental school and faculty, resigned his professorship. This type of dental education is carried out by some countries in Europe to-day, and is heartily approved by many educators in this country.

[1] President Hill of the University refers to it as 'The Dental College' in his *Report* for 1867–68.

In 1868–69 the lecture rooms and laboratories were located at 54 Anderson Street; in 1869–70 at 68 Cambridge Street, Boston. These quarters were small and unsatisfactory, and in 1870 the Dental School bought the property at 50 Allen Street and made the necessary changes to provide for lecture rooms, laboratories, and general headquarters of the School.

Discussion as to the degree which the graduates of the new Dental School should receive occupied considerable attention in the meetings of the faculty. Such schools as had been already established were giving the degree of Doctor of Dental Surgery, the degree now used by most dental schools. The degree Doctor of Dental Science (*Scientiae Dentium Doctor*) was given some consideration, but for the sake of simplicity and good Latin, it was decided to add simply *Dentariae* to the already established *Medicinae Doctor*. Accordingly the governing boards were recommended to confer the degree *Dentariae Medicinae Doctor* upon graduates from the Dental School.

There were six successful candidates for the degree at the first Commencement. The degrees were conferred by Dr. Henry Jacob Bigelow (A.B. 1837), the distinguished Professor of Surgery. Thomas Fillebrown, one of the successful candidates, later became Professor of Operative Dentistry and of Oral Surgery, and one of the best-known teachers of dentistry throughout the country. Robert Tanner Freeman, a colored man who had been rejected by two other dental schools on account of his race, was another successful candidate. The dental faculty maintained that right and justice should be placed above expediency, and that intolerance must not be permitted. Dr. Freeman was the first of his race to receive a dental school education and a dental degree.

In early establishing its leadership in dental education, the dental faculty, in its third session, made a recommendation, which was approved by the Corporation, to abolish the allowance of five years of practice as the equivalent to the first year's course of study in the Dental School, which, up to then, had been the universal custom in all dental schools in existence. This was an important step in advance for the profession and for dental education, but it meant pecuniary hardship to the Harvard School for the time being, when it was the only dental school to enforce a rule now generally recognized as necessary for sound education and professional efficiency.

In 1871 Dean Keep, 'the father of the Dental School,' resigned because of ill health. He was one of the most experienced and celebrated dentists of his day, generous with his wealth of experience, prudent and wise in counsel, an earnest investigator, a simple, modest man, ever ready to lend his hand for the advancement of the School. He died in March, 1875.

The second Dean, Thomas Barnes Hitchcock (M.D. 1860), Professor of Pathology and Therapeutics, was elected in 1872. This was a very popular choice, for Dean Hitchcock was beloved by the students and by his colleagues. He was an indefatigable worker for the cause of the School. His death two years later, due to overwork and overstrain, was a great loss to the School. One writer said of Dean Hitchcock, 'He was a martyr to the Dental School, to dental education and to all dental progress.'

Thomas Henderson Chandler (A.B. 1848, LL.B. 1853), Professor of Mechanical Dentistry, was elected his successor, and served in that capacity from 1874 until 1895. Dr. Chandler brought to the deanship a striking personality and fine scholastic attainments. He well maintained the Harvard standards of stability and thoroughness. Soon after his election, and upon his recommendation, the curriculum was revised and a progressive course of instruction established, extending over two full academic years.

In 1883 the Medical School moved from its North Grove Street quarters (the site now occupied by the Administrative Building of the Massachusetts General Hospital) to the new building at Boylston and Exeter Streets. Through the generosity of the faculty of the Medical School, the Dental School was given the use, without charge, of the vacated Medical School building; and the property at 50 Allen Street was sold.

At this period the Dental School was fortunate in its clinical facilities, for its operative dental clinic was held in the Out-Patient Department of the Massachusetts General Hospital, where an abundance of patients who required extraction, fillings, and other dental work were available. The dental students also had the opportunity of treating fractured jaws and witnessing various surgical operations.

During Dean Chandler's administration, a number of promising young men, who later became stalwarts during Dean Smith's administration, were added to the dental faculty. During these years, the professors from the Medical School instructed the dental students without compensation, and none of the Dental School demonstrators and teachers, with the exception of the demonstrators in operative and in prosthetic dentistry, received salaries, but they rendered their teaching services gratuitously; this service has been rendered by loyal graduates practically to the present day.

In 1895, Eugene Hanes Smith (D.M.D. 1874) was elected Dean. His administration of twenty-nine years was marked by many changes. Dentistry and dental education in this period developed very rapidly. One of the first important changes at Harvard, in 1899, was the merging of the faculty of the Dental School with that of the Medical School, the new body being known as the Faculty of Medicine, and including the professors of the Dental School. The Executive Committee of the Dental School was replaced by an Administrative Board. This is probably the earliest instance in any university of such a close mingling of medical and dental faculties.

Soon after 1900 the National Association of Dental Faculties passed a vote requiring the extension of the usual three-year course in dentistry to four years. The Harvard School insisted that the entrance requirements should first be put on a firmer basis, and that the minimum requirement for admission to a dental school should be four years of liberal education in a reputable high school. Dean Smith further insisted that the academic year for dentistry be lengthened to nine months. This seemed such sound judgment that the National Association rescinded the vote to establish a four-year course in dentistry.

Dean Smith was instrumental in the formation of the Dental Faculties Association of American Universities, which because of its high ideals played an important part in raising the standards of dental education.

In 1909 the present building of the Dental School on Longwood Avenue was dedicated. This was one of the outstanding achievements of Dean Smith's administration. It is entirely a dental infirmary or hospital, all the lecture rooms and laboratories for training in the medical and biological sciences being in the buildings of the Medical School, which is connected with the Dental School by subway. This new building was made possible partly by generous gifts of the graduates and friends of the Dental School, the balance being loaned by the Corporation.

The personnel of the dental faculty in the early days was distinguished. It was the custom of President Hill, and later of President Eliot, to preside at the meetings of the dental faculty. Oliver Wendell Holmes and Henry J. Bigelow were members of the faculty and attended the meetings regularly. Succeeding generations of dental students have had instruction and inspiration from such great medical teachers as Charles Sedgwick Minot, Henry Pickering Bowditch, Thomas Dwight, Harold C. Ernst, and in surgery, Maurice H. Richardson. The Administrative Board under Dean Smith, was an outstanding group, including the following men:

Charles A. Brackett (D.M.D. 1873), Professor of Dental Pathology and one of the most beloved of Dental School teachers, brought an earnestness of purpose and breadth of vision which was invaluable in the development of the School. Dr. Brackett's length of service to the School was unusual, his retirement coming after fifty years of teaching. At his death the Dental School was the residuary legatee of his estate, which amounted to well over three hundred thousand dollars.

Edward C. Briggs (D.M.D. 1878, M.D. 1880), Professor of Materia Medica and Therapeutics was an outstanding practitioner in Boston, always progressive, with a large fund of common sense.

George H. Monks (A.B. 1875, M.D. 1880), who for many years was a teacher in both the Medical and Dental Schools, and in 1909 became Professor of Oral Surgery, brought a medical point of view to the deliberations of the Administrative Board. Dr. Monks firmly believed in a close affiliation of dentistry and medicine. He became emeritus in 1926.

William P. Cooke (D.M.D. 1881), Professor of Preventive Dentistry and Oral Hygiene, a forceful, energetic man, was chairman of the building committee, and his enthusiasm and devotion made possible in large measure the present building. Dr. Cooke resigned in 1924 and was made emeritus.

William H. Potter (A.B. 1878, D.M.D. 1885), Professor of Operative Dentistry, was a man of totally different characteristics from his confrères; quiet, unassuming, yet none the less forceful. His progressive attitude was of great assistance in the development of the Dental School. Dr. Potter made a brilliant record for himself and for the School in the World War.

Waldo E. Boardman (D.M.D. 1886), whose interest and energy developed the Dental Museum and Library, was another important member of this Board.

These men served at a period when modern dentistry was in its infancy, and they kept Harvard at the forefront. They were helped efficiently, however, by many of the graduates of the School, who served as teachers in all departments at a sacrifice of time and energy, with no salary.

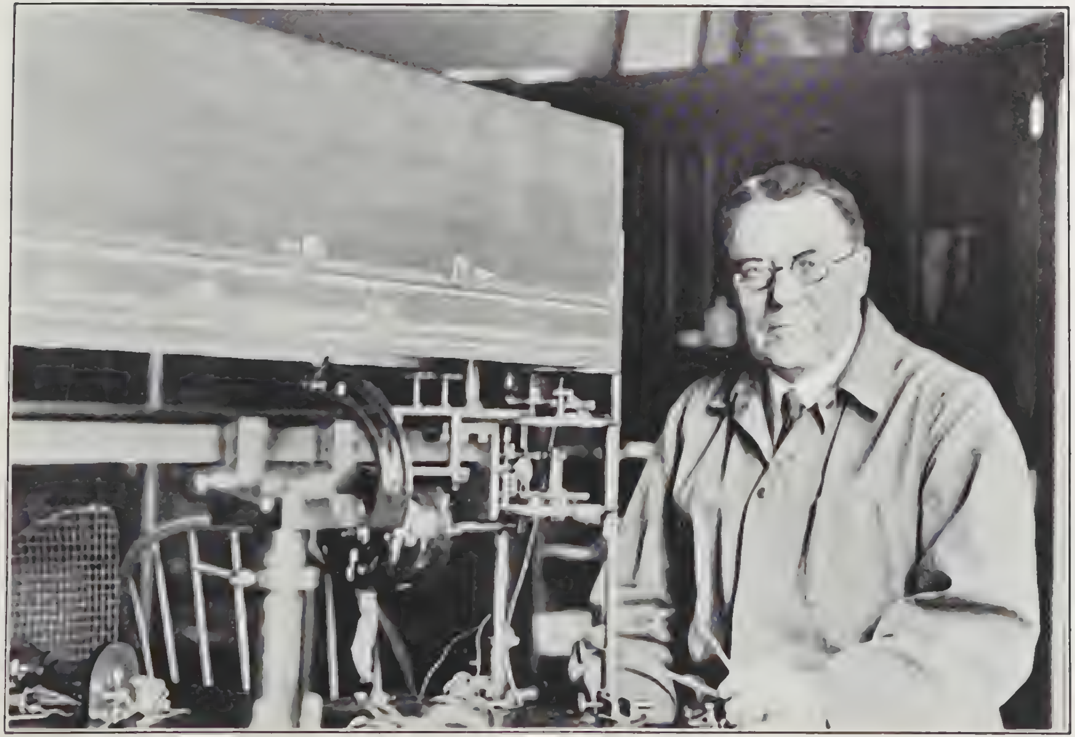
Dean Smith was obliged to resign on account of ill health in April, 1924, and died in May, 1925. His successor, the fifth dean, is Leroy M. S. Miner (D.M.D. 1904, M.D. Boston University 1907).

The record of the School during the World War was distinguished. More than two hundred and fifty graduates served in various capacities at home and in France, and of these, eleven lost their lives. In their different fields of work they met the requirements of service with credit to themselves and with honor to Harvard. Dr. Varaztad H. Kazanjian (D.M.D. 1905), who sailed with the Harvard Unit in 1915, made an especially brilliant record in reconstructive surgery of the face, and was called by an English writer 'the miracle man of the Western Front.'

As we review the history of the Dental School during its sixty years of existence, we can trace the progress of dental education in general. Take, first the length of the course leading to the degree of D.M.D. During the first years of the School, the requirement was two terms of four months each. In about ten years the course was lengthened to two years of nine months each; in 1891 to three academic years; and in 1917 the four-year course went into effect. At the same time there was a gradual increase in the requirements for admission to the Dental School. In the beginning a candidate merely had to pass examinations in English and physics. Between 1904 and 1921, four years in an accredited high school were required. In 1921 at least one year's study in a college of arts or science was prescribed, with physics, biology, chemistry, and English as obligatory subjects. This is the present qualification, except that in 1925 the minimum college residence was lengthened to two years. This places the preliminary training for dental education at Harvard on a par with the minimum requirements for admission to the medical schools of the country. In the class which entered in 1928, forty per cent were bachelors of arts or of science.

On account of the rapidly developing appreciation of the fact that the teeth are vital factors in the maintenance of a healthy body, dentistry has become an important part of the broad field of medicine. With this new conception of the subject, mechanics, which has always been the chief concern of the dentist, becomes the servant rather than the master of fundamental biological and medical principles. The need for a broader training has constantly increased, and the Harvard Dental School has tried to anticipate these rapidly growing requirements.

EUGENE HANES SMITH



WALTER BRADFORD CANNON

XXXVII. THE SCHOOL OF PUBLIC HEALTH

1909–1928

By David L. Edsall, M.D.
Dean of the School

THE primary step that led to the ultimate establishment of the School of Public Health was the reorganization of the Department of Hygiene of the Harvard Medical School in 1909, as a Department of Preventive Medicine and Hygiene. At the same time Dr. Milton J. Rosenau was appointed to the new chair of that name. He brought a wide experience in modern public health, and carried this in practical and stimulating ways into the training of men.[1] Previously the few departments of hygiene that existed discussed chiefly the rather dull methods of sanitation. The change was to what the new name, Preventive Medicine, properly implies; that is, investigative, epidemiological, and administrative considerations of public health, particularly as related to the work of the practising physician. Two years later, there was established in the Graduate School of Applied Science the Gordon McKay chair of Sanitary Engineering, thus covering in the University another broad division of public health.[2] Furthermore, George C. Whipple, who was appointed to this chair, was not only a distinguished sanitary engineer, but an authority on vital statistics, a subject of cardinal importance in public health. Through the efforts of these two men and Professor William T. Sedgwick of the Massachusetts Institute of Technology, there was established in 1913, conjointly by Harvard University and the Massachusetts Institute of Technology, a School for Health Officers. Rosenau became Director of the School, and Sedgwick chairman of its Administrative Board, of which the third member was Whipple.

This conjoint School (renamed The School of Public Health in 1917) continued active training of men with much success for nine years, its work ceasing in 1922 after the new Harvard School of Public Health had been formed. During the nine years that the Harvard-Technology School was in operation, it conducted a course one year in length for the training of health officers, and those who creditably passed the examination at the end of the year were given certificates signed by the President of Harvard University and the President of the Massachusetts Institute of Technology. There were ninety-eight candidates for certificates during the nine years, and eighty-two certificates were granted. Counting special students in public health and industrial hygiene, the total number of students taught in the conjoint School was three hundred and ninety-four. Among them were a considerable number of men who since have achieved distinction in active public-health work, and some have done important research. Indeed the record of that School is remarkable. It was a pioneer organization, without funds, dependent for existence and activity upon the devotion of a group of persons interested in improving public-health training, and who asked little recompense except the opportunity to influence public welfare.

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[1] See above, page 573, and note.

[2] See above, pages 428 and 430.

The establishment of the Harvard School of Public Health in 1922 was in large part due to the effective work that the conjoint School had done. There were, however, other steps. The Department of Comparative Pathology in the Harvard Medical School, established on the George Fabyan foundation in 1896 with Theobald Smith as the professor, had given courses both in the Medical School and the School of Public Health, on the various divisions of the general subject of parasitology, one of the most important branches of public-health work. The Department of Tropical Medicine, established in 1913, taught the scientific basis as well as the clinical aspects of that subject. In 1918, there was created, from special funds given by certain industries, a Department of Industrial Hygiene, to train men for medical positions in industrial establishments, and to study the health problems of industry — the first academic undertaking of this character. All three departments actively engaged in research from the beginning. So a large part of the structure necessary for a faculty and school of public health had already been developed by the Medical School, when an opportunity came to complete it.

In 1921, the Rockefeller Foundation proposed through its International Health Board to aid in the establishment of a school and faculty of public health in Harvard University, by providing funds for additional activities which the University authorities felt to be necessary before such a school could be properly conducted. This generous offer was accepted, the old School was dissolved, and the new Harvard School of Public Health was opened in September, 1922. It was, and is, independent of the Medical School in policy, control of teaching and degrees, and in certain other ways; but it was planned to be, and has remained, intimately coördinated with the Medical School. Each has actively reinforced the other in teaching, in research, in the provision of funds, and in other ways. In certain subjects, as in bacteriology, parasitology, and tropical medicine, the same department has conducted suitable courses for public health students as well as courses for medical students; the personnel and other facilities of the departments being somewhat enlarged in the process. The Department of Preventive Medicine, in addition to its previous Medical School course, took over the teaching of epidemiology in the School of Public Health. The Department of Industrial Hygiene, the activities of which had been in very large part in the physiological aspects of industrial hygiene, was renamed the Department of Physiology of the School of Public Health. It has continued its important research in the numerous and pressing problems of the health hazards of industries, and the training of men to deal with such problems. The clinical and toxicological aspects of industrial hazards were also provided for in subdivisions of that department. The Sanitary Engineering Department of the Engineering School has continued to coöperate in the training of public-health students, and conversely, the School of Public Health since 1926 has offered to advanced students from the Engineering School instruction in the hygienic aspects of engineering, an undertaking with large possibilities.

With the money provided by the Rockefeller Foundation and from other sources, these departments were developed and extended. Special personnel and facilities were provided for teaching and research in vital statistics and in public health administration. The State Commissioner of Health, the Commissioner of Health of the City of Boston, and other distinguished health officers have given constant and interested coöperation in the training of men in public health administration and epidemiology. There was also established a successful course in Child Hygiene, and the Department of Psychiatry has coöperated in giving a course in Mental Hygiene. A sub-department of Ventilation and Illumination was provided, elaborately equipped for research as well as teaching.

In 1927 an additional generous gift was made by the Rockefeller Foundation. Through that it has been possible to consolidate what had been simply an arrangement of lectures and demonstrations by various persons, into an actual Department of Public Health Administration prepared both for teaching and research. A sub-department of Child Hygiene, for studying and teaching the highly important problems of child health, has also been developed. Extensions were made in other departments also, particularly in parasitology, with special provision for medical entomology. Considerable further facilities for research in these several subjects were made possible at the same time, and a generous part of the new funds were allotted for library purposes. These last have made possible great improvements of library facilities and space, both for the Medical School and the Public Health School, and have increased the budget available for the combined Library.

The numbers of students have been small, and students from the United States will continue to be few for some time to come. In many countries public health positions are more or less pawns in the political game, and thus are often insecure, in spite of the great importance to public welfare of expert training and continuity of effort in this work. In certain regions of the United States political interference has recently declined, yet many of our states and municipalities are far below those of other civilized countries in this respect, as well as in the relative compensation of health officers. Despite a tendency to improvement, it will be some time before the career of public health officer can attract large numbers of men of superior training and ability. Believing that, under these conditions, small accessions of well-trained men will advance public welfare more rapidly than would larger numbers with inferior training, the School has made no attempt to enroll any except highly competent persons, and has held to its strict standard from the beginning, without regard to numbers. A very large proportion of the students has come from abroad, mostly from countries which have recently undertaken active public-health developments. Such students have been sent by their governments, or on fellowships provided by philanthropic foundations.

The relatively small numbers that have passed through the School do not begin to indicate the influence that it has had upon the development of public-health standards and public-health practice. Almost all our students have come to Harvard already designated by their local authorities as individuals suitable for some definite public position, after studying here. Their opportunities for influence upon public welfare have been out of proportion to their numbers. There are very few graduate schools in which the students have governmental positions awaiting them, with both opportunity and power for accomplishing results. Of one hundred and two persons from foreign countries, who had been trained in the School of Public Health during its first five years, it was ascertained that in 1928 ninety-nine held governmental positions in twenty-seven different countries, including an important place in the health work of the League of Nations. Of the other three, two were in private practice of medicine and one in commercial work.

The training of students is, however, but one activity of a school of public health. Each department has from the beginning been busily engaged in investigation, some of the results of which, such as the studies of lead poisoning and of the effect of air conditioning on premature infants, have already altered methods of treatment as well as the physiological or pathological points of view. Studies in other aspects of physiology have also been fruitful. In addition to the actual research, there have developed extensive consultative relations between the several departments of the School on the one side, and governmental authorities, industries, philanthropic and other organizations engaged in public-health activities, on the other. This has become an unexpectedly large and time-consuming activity of the School, but a highly useful and important one, which will undoubtedly continue to grow in amount and effectiveness. Great numbers may be benefited by one bit of advice to a government, a great philanthropic institution, or a large and widely spread industry. As an example, the Department of Physiology, after considerable research on conditions in which there is failure of respiration, prepared at the request of certain large organizations, a pamphlet[1] on resuscitation from drowning, gas poisoning, electric shock, and the like. In a little over a year more than 7,500,000 copies of this pamphlet, in various languages, have been distributed to persons whose work makes them likely to be called upon to deal with emergencies of that sort.

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[1] *Resuscitation by the Prone Pressure Method* (American Gas Association and National Electric Light Association, New York, 1929).

XXXVIII. THE HARVARD COLLEGE LIBRARY

1877–1928

By William Coolidge Lane, A.M.
College Librarian, 1897–1928

1. From Sibley to Winsor

THE fifty years from 1877 to 1927, beginning with Justin Winsor's appointment as Librarian and ending with the close of Professor Coolidge's term of service as Director of the University Library, form a well-marked and most important chapter in the history of the Harvard Library. This period had been preceded by John Langdon Sibley's long service of thirty-six years (1841–77), fifteen as Assistant Librarian under Thaddeus William Harris, and twenty-one years as Librarian. Gore Hall, the first Harvard building devoted exclusively to library uses, was completed in 1841, when Sibley directed the moving of the 41,000 books from Harvard Hall to their new quarters.

Sibley's administration belonged to the period when books were hedged about by many restrictions now thought unnecessary; when it was customary to call them back to their shelves at least once a year, in order that a visiting committee might check them over; when only a printed catalogue and an inconvenient record of later accessions was available; and when nothing more than a very general classification of books on the shelves was ever thought of. Sibley was a steadily industrious collector of books and pamphlets and every kind of printed matter, — a 'sturdy beggar' he called himself, — and as a result of his efforts the Library, in 1877, had increased to 164,000 volumes, with perhaps the same number of pamphlets. To undergraduates he may have seemed crusty, but his attitude was a liberal one toward scholars. He had little sympathy for the desultory reader seeking only amusement, and would not tolerate any abuse of library privileges; yet to anyone doing serious work he would grant access to the alcoves, and give ready and efficient aid.[1]

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[1] Potter and Bolton, *The Librarians of Harvard College* (1897), p. 41. An excellent and appreciative sketch of Sibley's life and character is given in A. P. Peabody's *Harvard Reminiscences* (1888), pp. 146–154.

Some improvements, looking toward more effective methods, began to be introduced in his day. In 1861 Ezra Abbot, later Bussey Professor of New Testament Criticism, and Charles A. Cutter, afterwards Librarian of the Boston Athenæum, began a card catalogue by authors and subjects designed for the use of the public; more liberal hours of opening were gradually introduced; in 1859 women were first employed in the Library as clerical assistants; the Library Council was established (1867); and a quarterly Bulletin to record current accessions was begun in 1875.

Sibley's administration was also marked by the receipt of a number of notable private collections — the books of Henry Ware Wales, Clarke Gayton Pickman, President James Walker, and Charles Sumner, and President Sparks's collection of manuscripts bearing on American history. The income available for the purchase of books and for binding increased from $250 in 1841 to about $11,000 in 1877. Under these conditions Gore Hall, which, when built, was expected to suffice for sixty years at least, was reported *full* by Sibley in 1863. Sibley, nevertheless, did not relax his efforts to accumulate books, and every succeeding year added to the difficulties of the situation. Yet he strenuously opposed every suggestion for enlargement, believing that Gore Hall was fundamentally unsuited for library purposes and that a new building must be erected without delay. It is fortunate that a new library building was not then attempted, for neither architects nor librarians had yet learned how a great library should be planned or built. All the experience painfully gained during the next forty years was needed as a preparation for the successful planning and execution of the superb building which was erected for the Harvard College Library in 1915.

Strangely enough, the first important step which was destined fundamentally to change the character of library architecture was taken in the very structure which Sibley so bitterly deplored: the new wing added to Gore Hall in 1877. Since this was the outstanding fact at the beginning of the Winsor administration, we may well pause for a moment to note its significance.

Up to that time the usual plan for housing a great library presented a lofty central reading room surrounded by alcoves lined with books, and provided, when necessary, with galleries. Justin Winsor, in his fifth report as Superintendent of the Boston Public Library (1872), emphasized the necessity of compact storage, in book-cases eight feet high, double faced, and disposed in transverse parallel rows. The cases described were simply floor-cases, but they were placed in compact form. In his paper on 'Library Buildings,' contained in the Report on Public Libraries in the United States, published by the Bureau of Education in 1876, he made the further suggestion that additional space might be gained by placing another tier of similar cases above the first ones, with a light floor between. When this paper was written, the Harvard stack, with its six floors, was in process of construction, embodying the same idea, but with the important modification that the book-shelves, instead of resting on the floor or on several floors one above another, were themselves part of an iron framework which carried the whole weight of six tiers of shelving and rested directly on the foundations in the basement. This iron frame also sustained the light openwork iron floors between the rows of shelving, as well as the floors of the surrounding passageways between the shelving and the outer walls of the building; it also bore the weight of the roof. Here we have the first example of a book-stack[1] strictly so called, a form of construction since improved in some details, but in principle unchanged; a form which has now become almost universal in library buildings of any size. In 1928 it was adopted for the great Vatican Library by its former Librarian, Pope Pius XI.

Credit for originating the stack principle should be shared by three persons: Justin Winsor; Henry Van Brunt, who (with William R. Ware) was the architect of the building and solved the engineering problem; and President Eliot, who, against the advice of Sibley, authorized the adoption of this new and untried method of construction.[2]

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[1] The term 'stack' is sometimes loosely used to designate any compact group of book-shelves, even when they are simply floor-cases. It is properly restricted to a method of construction consisting of a metal framework which rests on the very foundations of the building and carries tier upon tier of shelving and even the roof over all. When Gore Hall was taken down it was impressive to see the stack standing firm and untouched, after walls and roof had been taken away.

[2] In his *Report* for 1875–76, p. 26, President Eliot wrote of the new Library wing: 'As there are several novel features in the design it must be confessed that the building is somewhat experimental, but the risks of an experiment could not be avoided inasmuch as the problem how to store books in the most compact possible manner . . . has not yet been anywhere solved.' See also Van Brunt's paper read before the American Library Association in 1879, *Library Journal*, iv, 294; and C. C. Soule, *How to Plan a Library Building* (1912), p. 280.

In September, 1877, Justin Winsor entered upon his service as Harvard Librarian. As Superintendent of the Boston Public Library for nine years (1868–77), he had been remarkably successful in increasing the use of that library and in enlarging the scope of its work. He came to the Harvard Library prepared to make the same kind of survey of conditions that he had made in Boston. So clearly did he see from the beginning the needs of the Library that in his first Harvard report (September, 1878)[1] he outlined substantially all the features of the policy which he afterwards consistently pursued.

It was, said Winsor, 'a fundamental principle that books should be used to the largest extent possible and with the least trouble.' All the measures which he recommended were adapted directly or indirectly to this end. They included better accommodation for readers; a greatly enlarged use of reserved books, with free access to a well-rounded general collection of selected books; the reclassification of the books on the shelves; the improvement and revision of the card catalogue; the use of print for a record of recent accessions; the expansion of the Bulletin to include the accessions to the departmental libraries and to contain helpful bibliographical notes and articles on topics of current interest; the publication of longer bibliographical handbooks or tools for library workers; the cultivation of more intimate relations among the different departmental libraries; the extension of the privileges of the Library to literary and scientific workers outside the immediate circle of the University; and, finally, a remodelling of the old portion of Gore Hall with a view to facilitate all these improvements. Each of these propositions deserves to be considered separately.[2]

2. ACCESSIBILITY

The extension of the reserved-book system, and greater liberality of access to the books as a whole, may, in my opinion, be considered Winsor's most important contribution to making the library serviceable to all departments of instruction. At that time the development of the elective system had reached a point where further progress would have been seriously blocked had not the Library freely responded to the new demands made on it. The first step naturally was a greatly increased use of 'reserved books,' books withdrawn from the general collection, at the request of instructors, and placed in groups according to courses, on open shelves accessible to all students. The reserving of books had started in a tentative way two or three years earlier, at the demand of Professor Henry Adams,[1] but no convenient provision for the use of such books had then been made. Under Mr. Winsor the practice was immediately accepted as valuable, and grew rapidly. In 1880, 3330 volumes were reserved at the request of thirty-five instructors, and the borrowing of these books for overnight use amounted to 10,500. At present, about 14,000 volumes are reserved in the course of the year, in addition to which some 150,000 other books in laboratory and classroom libraries are freely available to all students and serve much the same purpose.

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[1] The Librarian's Reports were printed separately, and may also be found in the President's *Reports*, in full from 1878 to 1908, and more or less abbreviated from 1909 to 1917. From 1910 they appeared as appended to the brief Reports of the Director. Since 1918, only the Reports of the Director have been printed, with a few tables and notes of gifts furnished by the Librarian.

[2] For fuller details see my paper in the *Harvard Graduates' Magazine*, vi (1897), 182–188, and another by W. H. Tillinghast and myself in the *Library Journal*, xxiii (1898), 7–13.

These special laboratory and classroom libraries were the natural result of the crowded condition of Gore Hall. Each supplied the needs of a separate department of instruction, and each was gathered at the expense of the department concerned or of some friend thereof, though all were soon placed under the care of the central library. The earliest were for the use of students of the classics, United States history, political economy, and mathematics. Many of them serve precisely the same purpose as the collections of reserved books in the College Library, but on a more generous scale, since they are able to provide more liberally duplicate copies of the most-used books. They do not, however, supersede the reserved-book collection, since the central Library has many books needed from time to time that the classroom libraries have never acquired.[2]

Winsor also believed heartily in permitting direct access to the general stack collection so far as this could be done without positive danger to the books, and without disturbing too seriously the good order of the stack. In other words, he insisted

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[1] See Professor Emerton's chapter on History, above.

[2] See the Librarian's Reports for 1887 and 1888. In that year ten such libraries were enumerated, with a total of 2759 volumes. The Report of 1927 names forty-one special collections, containing 144,710 volumes.

'that there should be no bar to the use of books but the rights of others.' A student of original sources himself, he realized that a library must 'teach the methods of thorough research and cultivate in readers the habit of seeking the original sources of learning.' Accordingly the stack was open from the beginning to all officers of the University, and in an increasing degree cards of admission were given to students, especially graduate students. The old Gore Hall stack was scantily provided with tables for readers, and it was impracticable to admit any large number of students. In 1880 there were 60; in 1887, the number had increased to 295. This was too large a number, and in the following years greater strictness was observed. Since 1891 every applicant for the privilege has been required to present a recommendation from his instructor. After 1896, when the new west stack was set up, the number increased to three or four hundred annually, and even more. When the new Widener Library, with its 300 stalls for the use of readers in the stack, was occupied in 1915, it became possible to extend this privilege much more freely, but still not so widely as the demand. Besides the eight or nine hundred officers of the University who are in the habit of using the Library, about 550 graduate students, 350 undergraduates (admitted for brief periods only), and 120 Radcliffe graduate students now generally have cards to at least some portion of the stack. To these must be added a number of visiting scholars who come hither to work, and a few other persons.

Any statement of the facilities open to students and scholars in the Harvard Library would be incomplete without mention of Thomas J Kiernan, inseparably associated with the memory of Gore Hall. He entered the Library service in 1855 and continued in it till his death in 1914, a period of fifty-nine years. As Superintendent of Circulation he had charge of the delivery desk, and exercised a kindly and watchful supervision over all the relations of the Library to its readers. Thousands of Harvard students and officers were indebted to his remarkable familiarity with the Library and to his unfailing helpfulness. By long practice he had cultivated the faculty of comprehending the trend of a reader's inquiry, and was thus able to serve him efficiently.[1]

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[1] *Library Journal*, xxxix (1914), 691. When the Widener Library was opened in 1915, Kiernan's place was taken by Walter B. Briggs, who began his library career under

3. Shelf Classification

If officers and advanced students are to have access to the shelves, the careful classification of the books on the shelves becomes of the first importance. The old arrangement of the Harvard Library had been of the most general nature, originally designed to keep the gifts of certain distinguished donors in separate alcoves. A new classification of the whole Library was promptly undertaken. The empty shelves of the new east wing, nominally capable of holding 300,000 volumes, stood ready to receive the newly classified groups, and rapid progress was made at the hands of George Francis Arnold, who in 1878 was appointed Curator of the Shelves. Mr. Arnold was a man of enthusiasm and scholarly tastes, with sound training. Many systems of classification were to be found in bibliographies, and exemplified in other great libraries. The decimal classification, invented by Melvil Dewey and first employed at Amherst, and the expansive classification developed by Mr. Cutter for the Boston Athenæum and since applied in many smaller libraries, were at this time just beginning to be discussed. None of the ready-made systems, however, were considered well adapted to use in the Harvard Library. All had been devised on theoretical or philosophical lines, aiming to divide up the whole domain of human knowledge in some appropriate or convenient fashion. A different procedure was adopted in planning the new classification here. The grouping of books in accordance with their practical usefulness to the several departments of instruction was the guiding principle. For example, American History, American Biography, and American Travel, with geographical and descriptive works, are all of value primarily to students of American history, and in a college library are most conveniently placed side by side. Yet in most philosophical schemes of classification, History, Biography, and Geography are among the primary divisions, and the American sections of each may be far removed from one another. The Harvard method results

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Kiernan, was for several years (1896–1904) Superintendent of the Reading Room, afterwards Librarian of Trinity College, Hartford, and finally returned to the Harvard Library as Assistant Librarian, where he continues the tradition of courtesy and helpfulness established by his predecessor. Charles A. Mahady, who succeeded Briggs as Superintendent of the Reading Room, also began his library service under Kiernan, in 1894.

in breaking the Library up into a number of collections, some large, some small, the composition and extent of each group being based on considerations of convenience to the student.

In the four years during which Arnold was Curator of the Shelves, about 70,000 volumes were classified and shelf-listed, covering some of the fields most important for teachers and students, such as American History; English, French, and German History and Literature; Folklore; Language and Classical Philology, besides some other smaller and less important groups. In 1882 Arnold was compelled to resign on account of failing health.[1] His work had been eminently careful and intelligent, practical in its details, and well adapted to the Library's needs, except in one point.

This point seemed at the outset of small importance; yet it was a mistake which involved the Library in difficulties and great expense for many years. The trouble was that the number given to a book as it was classified indicated the particular shelf to which the book was assigned, instead of the subject group to which it belonged, and to which it would always belong. One is known as a 'fixed location' number, the other as a 'movable' or 'relative location' number. At the beginning the former seems the simpler and more practical method, but it invariably breaks down after a time. Since a library never grows evenly, difficulty begins with 'fixed location' numbers as soon as the empty space at one point is filled up, while empty spaces elsewhere still remain.

In classifying the collections of Greek and Latin authors in 1882–84, a final break with the 'fixed location' method was made and the 'relative location' was definitely adopted as the Library policy. As the system is applied in this Library, the book-number (or shelf-mark) consists of a distinctive abbreviation (such as Afr. for Africa, AH for Ancient History, AL for

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[1] After Arnold's departure, Frank Carney, who had grown up in the Library from boyhood and had been Arnold's chief helper, continued to look after current additions, at first under my supervision and later under the direction of Mr. Tillinghast. He had the faculty of absorbing the Library's ways and traditions and of quickly grasping the point of view of those under whom he worked. From 1893 to 1911 he continued in direct charge of the current work of the shelf department, rendering valuable and intelligent aid to the specialists who were engaged in classifying the groups taken up later. He has seen the classified portion of the Library grow under his hands from 70,000 volumes in 1882 to almost 500,000 volumes in 1911. In 1911 he was appointed Superintendent of the Library buildings, and as such has been responsible for a variety of important duties about the Library.

American Literature), followed by a serial number indicating some subdivision of the general field. About 150 such abbreviations are in use, and the Library may be considered as made up of the same number of separate groups, varying in size from a hundred or more volumes to many thousand. The order in which these groups are placed in the stack has no reference whatever to the alphabetical sequence of the abbreviations, but is determined entirely by considerations of convenience and extent. To make room for growth, or to meet changing conditions of use, any group may be picked up bodily from its place and set down somewhere else without the alteration of a shelf-mark anywhere.

In the next ten years, owing to crowded conditions, only a few new groups were classified. But in 1895–96 the interior of Gore Hall was pulled to pieces, a new stack of three stories was introduced, and in the autumn work on reclassification began again. With the aid of specialists, it was pushed rapidly forward; and in eight years 176,000 volumes were reclassified. In the meantime the books numbered on the original 'fixed location' system had increased, by the absorption of new accessions, from the original 70,000 to 116,000, and had become more and more troublesome. After temporary expedients had been tried, the task of changing these old numbers was at length begun, and from 1904 to 1913 steady progress was made, French and German History, British History, American History, and Classical Philology being taken up one after another. The 116,000 'fixed location' volumes of 1904 were thus reduced to 76,000, comprising Language, Folklore, English, French, and German Literature.

William H. Tillinghast (A.B. 1877) had been in general charge of the shelf department since 1885. He died in 1913, before this final task was finished. His service in the Library had covered thirty-one years, and was marked by good judgment, a wide acquaintance with different fields of knowledge, patience in mastering detail and in solving difficulties, and by unstinted labor freely given in spite of failing health. After his death, the shelf department was united with the catalogue department under the charge of T. Franklin Currier (A.B. 1894), who was appointed Assistant Librarian. A way was finally found to treat these last groups by a more mechanical but fairly satisfactory method, changing only a part of the numbers and leaving the original classification undisturbed. With the work of the year 1914–15 the reclassification of the Library was in this way virtually completed.[1]

4. The Card Catalogue

The story of the public card catalogue is an interesting and varied one, from its inception on a new and ingenious plan in 1861, through successive revisions and progressive modifications. Finally it was completely transformed (1) by changing to a card of larger size and (2) by conforming to the common dictionary type throughout — both tasks of great magnitude. Ezra Abbot, Assistant Librarian from 1856 to 1872, originated the plan of the catalogue, which on its subject side attempted to combine the advantages of the classed catalogue with the convenience of the dictionary catalogue.[2] Winsor promptly recognized both the merits of the catalogue and the difficulty of making it consistent and readily intelligible. In his first Report, he recommended careful revision, printed explanations, conspicuous labels without and abundant guide-cards within, to assist a ready understanding of the catalogue. Samuel H. Scudder (s.b. 1862), the Assistant Librarian, undertook the revision of the subject headings and devised a system of numbers which would simplify references from one heading to another. My own time from 1882 to 1893 was largely given to continuing this revision, applying the numbers, and compiling a list of some 15,000 subject headings with references by number, which was finally printed in 1891. Gradual changes in the catalogue were introduced from time to time, which brought it nearer to the dictionary type; and a final study of the proper scope of a subject catalogue in a great university library showed that it might properly be limited in some respects without greatly diminishing its usefulness. Modifications of this nature were introduced in 1911.[3] A final recasting of the whole catalogue into the dictionary form was made in 1915, as will be noticed below.

Justin Winsor early advocated printing instead of writing catalogue cards, and in 1872 had begun to print titles for the card catalogue of the Boston Public Library, as is done to this day. At the Harvard Library he promptly enlarged the scope of the printed Bulletin, and in 1888 began to print cards from the type which had been set up for the Bulletin lists, the titles there printed covering about one third of the additions to the Library. In 1894 the publication of the Bulletin was suspended, but the printing of titles on cards was continued to about the same extent as before, with the advantage that a larger type and broader measure could be used, better adapted to card purposes. Four years later the Library entered into a coöperative undertaking with four other large libraries, to issue printed cards for the papers contained in about 250 serial publications, including the transactions of many learned societies. The first 10,000 titles printed showed that the expense of this method was very moderate — about eight and a half cents per title. This work was continued for about seventeen years, during which time over 50,000 cards from this source were added to the public catalogue.[1]

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[1] A careful discussion of the situation and description of the method adopted is given in the Librarian's Report for 1913, pp. 21–23.

[2] See Abbot's careful description of the plan in the 'Report of the Committee to visit the Library' (1864), pp. 35–76.

[3] See Librarian's Report, 1911, pp. 14–16.

In 1901 the Library of Congress began to print catalogue cards for its own use, and offered them to other libraries at very moderate cost. These cards the Harvard Library was glad to use to the largest possible extent,[2] and the number inserted in the catalogue steadily increased year by year.

In using cards furnished by other libraries, however, this Library had long been hampered by the fact that its cards were of a smaller size, so that the others had to be trimmed down before they could be inserted in the catalogue. The possibility of transforming the whole catalogue to the larger card had often been broached and the ultimate advantage of such a move recognized, but the expense was beyond the Library's means. At length, in 1910, Archibald Cary Coolidge, the new Director of the University Library, with his characteristic boldness and capacity for vigorous action, directed that the change should go forward, and himself contributed toward the heavy expense.

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[1] In 1919, the Wilson Company took over the printing and publishing end of the undertaking, and have since issued this material in cumulative book form as the International Index to Periodicals, instead of in card form. The more comprehensive and numerous the collection of a library becomes, and the more perfectly the bibliographical activities of the book trade are organized, the more a library may properly give up analytical entries in its card catalogue, and depend on the printed page.

[2] For the use made of these cards in relation to the coöperative periodical cards and those printed by the College printer, see the Librarian's Report, 1903, pp. 217–218.

JOHN L. SIBLEY

As a preliminary step the complete set of 470,000 Library of Congress cards and 72,000 issued by the John Crerar Library had to be installed and thrown into a single alphabet; upwards of a million and a half of our old cards had to be punched, so that they could be filed with the new cards while the change was in progress; and many other details had to be studied and settled.[1]

To obtain the titles which could not be got from the Library of Congress or elsewhere, it was determined to print the more important, taking them up in alphabetical order, and to type the rest. Twenty-four libraries subscribed to the printed titles. This covered part of the cost, and the rest was made up by Mr. Coolidge, who also bore the whole expense of preparing the titles for printing, so deeply was he interested in the success of the undertaking.[2]

When all preparations were complete, the work of substituting large cards for small was pressed on as rapidly as possible, so as to shorten the uncomfortable period during which the catalogue must be composed of both sizes. By August, 1913, some 121,000 titles (or perhaps three times as many cards) had been replaced by printed cards.

As the work on the public catalogue steadily progressed, it became evident that three other related improvements must be taken up. (1) The official catalogue, primarily for the use of the staff, must likewise be transformed to the standard card. (2) The public and the official catalogues must both be made complete by inserting copies of many thousand titles from each in the other. (3) A union catalogue must be formed by combining the reorganized official catalogue with the complete file of Library of Congress cards. All these enormous undertakings the staff took up gallantly and persistently under Mr. Currier's able supervision, and on carefully laid plans in which all members of the staff took a profound interest. By June 1, 1915, the reorganization of the catalogues was virtually completed. Over a million new cards, more than half of them typewritten, had been prepared for the public catalogue alone, and the cards which had been handled and filed must have amounted to almost three million. To crown the whole, it was decided to recast the whole subject catalogue in dictionary form, and merge it with the author catalogue. Willing coöperation on all sides and hard work brought it to a fortunate conclusion before the opening of College in the autumn of 1915.

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[1] Librarian's Report, 1911, pp. 7–16.

[2] Up to February, 1929, over 75,000 titles had been printed, and we were well along in the letter S.

The thirteen years that have followed have brought no further revolutionary changes, but a succession of difficult administrative problems arising out of the steadily increasing volume of accessions, the difficult nature of many of the collections received *en masse*, and the inadequate means available to build up a sufficient staff. Mr. Currier, in spite of these difficulties, has, with the coöperation of his staff, accomplished remarkable results, and his advice is sought and valued by cataloguers throughout the country.[1]

5. Growth of the Library

The following table gives some idea of the growth of the Library since 1870, from different points of view. A careful study of the figures back to 1840 shows that the Library has somewhat more than doubled in size each twenty years, and this geometrical ratio seems to give as yet no sign of diminishing.[2]

A comparison of the figures in the last two columns shows that, in spite of the marked increase in the income of funds for administration, the College has to draw from its other resources larger and larger amounts to make up the total for current expenses. This so-called deficit has grown from $20,306 in 1900 to $116,701 in 1928, a sum nearly six times as great. In the same period, the income of funds for books has increased about three and a half times, that for administration a little less than three times, while the cost of running the Library is now four and a half times as great as in 1900. There are now over ninety different book funds, and every cent spent for the purchase and binding of books and periodicals is exactly accounted for. The Library also receives many gifts from other donors to be spent for books, amounting annually to from four or five thousand dollars to eighteen or twenty thousand, and sometimes much more. To spend so large a sum wisely in the purchase of books is no light responsibility. A college library, it is true, may depend largely upon the advice of the teaching staff for whose advantage primarily books are bought. This cannot be uniformly depended upon, but so far as it goes is most welcome. Buying for the Harvard Library has now been for so many years in the hands of Mr. Potter,[1] and he has become so skilled in handling it and so familiar with the needs of the Library, that many of the officers have been inclined to leave the whole responsibility in his hands. But it is no easy task to apportion the expenditure equitably, to cover at once the demands for periodicals, for continuations and serials, and for books both old and new, and to keep constantly in mind the objects of the special funds and the special gifts confided to our care, as opportunities for purchase appear.

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[1] Mr. Currier entered the Library service in November, 1894, a few months after graduating from the College, and was placed in charge of the catalogue staff in May, 1902. In 1913 he was appointed Assistant Librarian and took over the direction of the combined catalogue and shelf department.

[2] The figures for the number of volumes and pamphlets are approximations only, since it is practically impossible to maintain an accurate count of a library's collections from year to year. In 1927, after consultation with other librarians, new rules for statistics of growth were adopted, which are thought to give a better basis for comparison with other libraries. See Librarian's Report, 1917, p. 8.

GROWTH OF THE COLLEGE LIBRARY

Date	Volumes	Pamphlets	Income of Funds		Expense of Administration
			For Books	For Administration	
1870...........	122,000	No record	$ 2,775	Nothing	$12,020
1880...........	187,000	100,000	12,434	$1,036	19,394
1890...........	272,000	150,000	15,241	23,388	29,917
1900...........	373,000	235,000	18,808	23,658	44,695
1910...........	543,000	375,000	18,068	24,647	54,996
1920...........	1,127,500		40,014	51,961	124,763
1928...........	1,405,200		63,843	65,918	203,083

Total University Library (1928) 2,784,300 volumes and pamphlets.

Any account of the Library is incomplete which does not give some idea of the succession of remarkable gifts which have come to it in an ever-increasing stream from a long line of generous donors. The whole Harvard Library is a veritable mosaic of gifts, and every volume that one takes up reveals by its book-plate the story of some gift or bequest.[1] Many of these gifts are mentioned in other chapters of this volume, but the reader should at least be reminded here of some of the more notable of those not elsewhere recorded.

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[1] Alfred C. Potter began work in the Library in the spring of 1889, while still a Senior in college. He became a regular member of the staff soon after graduation, and since 1893 has been in charge of the Ordering Department. He became Assistant Librarian in 1904, and Librarian in 1928.

Thomas Carlyle's bequest of his books on Cromwell and Frederick, which he left to Harvard College 'as a poor testimony of my respect for that alma mater of so many of my Trans-Atlantic friends,' and as testifying 'a variety of kind feelings, obligations and regards towards New England . . . recognizing with gratitude, how much of friendliness, of actually credible human love I have had from that country.'

The Francis Parkman bequest of early Canadian history.

The Frederick L. Gay bequest of several thousand political tracts of the English Civil War period, with 2200 rare Americana.

Miss Amy Lowell's bequest of 3700 volumes from her choice library of early editions, books of association, and English poetry.

W. W. Nolen's bequest of his great collection of Lincoln books, pamphlets, portraits, and memorabilia, which, with Alonzo Rothschild's Lincoln collection and the Library's own well-stocked shelves, gives us special strength in that field.

The libraries, entire or in part, of James Russell Lowell, Charles Eliot Norton, Longfellow, Sophocles, Felton, Ezra Abbot, Gurney, Ticknor, Bôcher, Palmer, William James, Morris H. Morgan, and many other professors in the University.

The Bowie library of classics and early printed books, given by Mrs. E. D. Brandegee.

Copinger's extraordinary collection of Thomas à Kempis, given by James Byrne.

Harcourt Amory's fascinating Lewis Carroll books, manuscripts, and drawings.

A collection of Utopias lovingly gathered by Francis G. Peabody.

Ernest L. Gay's unrivalled John Gay collection, with many rare Americana, presented by his nephew.

John B. Stetson, Jr.'s repeated gifts to build up a strong collection of Portuguese history and literature, to which he has lately added the great Palha library.

A. C. Coolidge's numberless gifts, continuing over more than thirty years and covering many different fields: Slavic history and literature, Von Maurer's Scandinavian books, the Riant library on the Crusades and the Ottoman Empire (in part), the Boulay de la Meurthe library on the French Revolution (in part), the Hohenzollern collection on German history, Luis Montt's South American books (with Clarence L. Hay), French historical sources, and Russian art.

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[1] A record of the funds of the Library and a list of the more important gifts down to 1915 is to be found in Potter's *Descriptive and Historical Notes on the Library of Harvard University*, 3d ed., 1915. Many of the gifts are described in some detail. For notices of more recent gifts see the *Harvard Library Notes*, edited since 1920 by George P. Winship.

The three great gifts which signalized our entry into the Widener Library may well be mentioned together:

Harry Widener's distinguished and costly collection, comprising rare and early editions of English literature, association books, authors' manuscripts, extra-illustrated books, and color-prints.

Daniel B. Fearing's books on angling, fisheries, and fish culture, about 11,500 volumes.

Robert Gould Shaw's rich collection of theatrical books, playbills, autographs, prints and photographs which, with Evert J. Wendell's bequest received soon after, and bringing to the Library 32,000 volumes and pamphlets and 250,000 other items, playbills, sheet music, portraits, etc., largely of theatrical interest, makes the Harvard Theatre Collection probably stronger than any other in existence.

Finally, a word should be said of two very recent gifts:

The wonderful series of rare and costly editions of English literature of the sixteenth and seventeenth centuries recently given anonymously in honor of Lionel de Jersey Harvard.

The William A. White bequest of eighty-eight Shakspere quartos, to which have been added, from his library, at the expense of members of his family and a number of friends, 283 volumes of the highest rarity, editions of English literature of the late sixteenth and early seventeenth centuries.

Such a record of unflagging generosity and loyalty on the part of donors, largely but by no means exclusively graduates of the College, of which only some of the principal instances are touched upon above, deserves far ampler appreciation and description than can be given within the narrow limits of this chapter. It recalls the pious wish expressed in the Harvard Hymn, — *Largiantur donatores bene partas copias*, — of which it is a most acceptable and very generous fulfillment.

6. Gore Hall and the Widener Library

It is a remarkable fact that until 1912, when Mrs. Widener offered to build the Harry Elkins Widener Memorial Library, Harvard had never received any substantial gift for a library building. Gore Hall was built, it is true, from the bequest of

Christopher Gore and appropriately so named; but the money had not been destined for this purpose by the donor, and by that use of it, the free income-bearing funds of the College were diminished by $60,000. Likewise, when the new wing was built in 1875–77, $90,000 was withdrawn from income-bearing funds, and the College was hampered as to income for years to come. The result was that, while the money was wisely spent and the expenditure was unavoidable, it had to be confined to providing absolutely essential elements at the least possible cost. The deficiencies from which the Library had to suffer later were, in part at least, caused by this fact.

In 1877 it was expected that the reading room in Gore Hall would be retained, but remodelled to increase its book capacity and made fireproof. Later it became evident that a better course would be to build a new reading room to the north of the east wing, and devote Gore Hall to an extension of the book-stack and to administrative purposes. But means were lacking to carry out either plan. At last the students took up the matter. After petitioning in vain that the reading room should be lighted, they organized a committee in the fall of 1890, which set out to raise a hundred thousand dollars to build a new reading room. President Eliot supported the movement with an admirable article in the Harvard Monthly. With the help of a graduate committee, circulars were sent out to 6000 graduates, and subscriptions amounting to over $22,000 were reported. But the President's Report the next year set the probable expense at $150,000, with $100,000 more needed for stack extension. At this time Frederick Lothrop Ames, a Fellow of Harvard College, determined to supply the need of a new reading room himself. For eight months he was in frequent consultation with the Librarian and with an architect, and the Library held its breath, so to speak, hoping to see the great reading room it had longed for become a reality. But in September, 1893, Mr. Ames suddenly died, having made no legal provision or written promise to give the building; and it appeared that no one had the requisite authority to carry out his clear intentions.

This was a cruel blow, but relief of some kind could not be long delayed. During the next year 15,000 volumes had to be boxed up and stored in the cellar of Appleton Chapel, to make room for new accessions in Gore Hall, and the same thing was bound to happen again and again. In the summer of 1895, work was at length begun on remodelling Gore Hall. The fluted columns and groined ceiling of the reading room were torn down, the alcove partitions disappeared, and the walls were stripped of their lath-and-plaster lining, that the building might be made fireproof. An iron stack of three stories was built, occupying the whole area below, with a reading room above reaching to the roof, ample in size, well lighted by the high windows and by a skylight, but uncomfortably hot in summer. The added shelf-room was most welcome, but the newspaper collection had to be left in the basement of Perkins Hall, where 80,000 volumes also had been stored during the progress of the work. A temporary reading room had been opened in Massachusetts Hall, but everything was promptly moved back to Gore Hall in the early spring of 1896. Electric light had been introduced, and there was rejoicing that the Library could be kept open to a reasonable and fixed hour in the afternoon, and that the reading room was at last available through the evening.

In 1902 the Corporation appointed a committee consisting of the Director of the Observatory (Professor Pickering), Chairman, the librarians of the Law School, the Museum of Comparative Zoölogy, and the Divinity School (Messrs. Arnold, Henshaw, and Morison), and the College Librarian (Lane), to 'study the future needs of the College Library.' As preliminary to such a study the Committee proceeded to inquire what policy the Library ought properly to pursue in respect to three points: (1) the maintenance of a central library or a number of separate special libraries; (2) the desirability of separating 'live' from 'dead' books, with a view to more economical storage; and (3) the expediency of enlarging Gore or erecting a new Library. To consider these questions the Committee invited to a conference the Corporation, the College Faculty, and the Library staff. The general sense of the meeting was clearly in favor of a central library, and that no economy consistent with the needs of scholars was to be gained by discriminating between 'live' and 'dead' books. The Committee agreed, and in March, 1902, presented a report valuable alike for clear statements on policy and for practical details; and of direct service when the actual opportunity came to build.

Still the University awaited the benefactor who had the means and the generosity to give reality to these dreams. In the meantime, at the initiative, and partly at the expense, of the Visiting Committee of the Board of Overseers (Francis R. Appleton, Chairman), a two-story concrete addition to Gore Hall, carefully planned to meet the precise needs of the Library, was built in the spring and summer of 1907. It gave the Library on the first floor a vastly improved delivery and catalogue room, a small reference room adjoining, and three rooms for the work of the staff; on the second floor, a Treasure Room [1] for the storage and use under safe conditions of the rarer books of the Library, a map room, and a classroom. During the remaining years that the Library continued in Gore Hall, we had constant cause to bless the generous action of the Visiting Committee. Without the new facilities they bestowed upon us, it would have been almost impossible to continue the Library service. The economy of this concrete-block construction was so evident, and the appearance of the building was so handsome, that the idea found acceptance that future additions to the Library could best be made in the same way.

In 1909 the Visiting Committee requested the Corporation to appoint a committee of architects to advise in determining without delay the form and character of a future library building. The committee named consisted of Charles A. Coolidge (A.B. 1881), Désiré Despradelle, and Guy Lowell (A.B. 1892). Their report recommended the eventual rejection of Gore Hall, and blocked out a plan to show that successive sections of a new building might be erected on the south side of Gore Hall from time to time as needed, to be finally completed by a handsome façade on the north when Gore Hall itself should finally be demolished. It was most fortunate that the plans set forth by this committee, and the report on various details made by the committee of 1902, were both at hand to show what was needed when Mrs. George D. Widener's munificent offer was made to build a library worthy of the precious collection made by her son, Harry Elkins Widener (A.B. 1907), and fitted to the scholarly uses of the University to which he had destined his books.

Mrs. Widener's offer was joyfully accepted, though it meant the immediate demolition of Gore Hall, since the new library was to rise complete from the site of the old building and would extend in addition nearly to the street. Prompt action was needed to prepare for moving and to provide quarters ready for the opening of the College term. The upper floor of Massachusetts Hall was taken for a temporary reading room, the lower floor furnished a supplementary reading room for American history and shelving for the Congressional and Parliamentary documents.[1] Randall Hall, built for a dining hall, was fortunately standing unused. Here a simple four-story stack holding about 400,000 volumes was built, the moving of books began October 10, and was completed December 7, 1912. Other sections of the Library were hospitably received at the Andover Theological Seminary library, in Emerson Hall, in Robinson Hall, and elsewhere. The delivery room and the card catalogues were installed in Randall Hall, and the staff found sufficiently comfortable, if somewhat crowded, quarters in the former serving-rooms and kitchens of Randall Hall.[2]

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[1] I think this term, now widely used, was applied here for the first time. It was suggested to me by Charles Eliot Norton.

The plans for the Harry Elkins Widener Memorial Library were made in the office of Horace Trumbauer in Philadelphia. In working out their details, the special requirements of the Harvard Library and the desires of the Harvard authorities were constantly deferred to. The destruction of Gore Hall, dear to the memory of those who had long worked in it, was soon begun and speedily finished. The first sod for the new building was turned on February 11, 1913, and the corner-stone was laid on June 16, 1913. The Widener Library was dedicated on Commencement Day, 1915, when Mrs. Widener presented the key of the building to President Lowell. Moving began that afternoon, the staff took possession the middle of August, and the moving of books was finished on October 7. In fourteen weeks 645,000 volumes had been taken from Randall Hall and from thirteen other depositories and placed in order on their allotted shelves in Widener, ready for use.

No extended description of this great and admirable building can be attempted in this chapter.[3] As distinguishing characteristics may be mentioned the three hundred reading-stalls in the stack, where students may gather the books they are directly working with in close proximity to the collections of the Library, and the seventy small rooms assigned to professors as studies, in which they may keep their own working collections and in addition books drawn from the stack. The capacity of the stack as shelved at the outset was estimated at about 1,433,000 volumes (that is, 179,000 running feet of shelving). Additional shelves added from time to time have increased that capacity by about 60,000 volumes. In the summer of 1928 a further generous gift from Mrs. Widener (now Mrs. A. Hamilton Rice) equipped with complete shelving the two lowest stories of the stack, which had been left as mere skeletons at the beginning. This adds almost 500,000 volumes to the total capacity of the building. Since the opening of the Library the map room on the top story has been made a memorial to Justin Winsor, and a room on the first floor near the entrance, not occupied at first, has been equipped and furnished with attractive books by Mr. William Farnsworth (A.B. 1877) and his wife, in memory of their son Henry W. Farnsworth (A.B. 1912), who died in the World War while serving in the Foreign Legion. This is known as the Farnsworth Room and is highly prized as a quiet place devoted to leisurely reading.[1]

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[1] Massachusetts Hall was not restored to its ancient use as a dormitory until 1925.

[2] All details of the moving into Randall Hall and the subsequent return to the Widener Library are given in the Librarian's Reports, 1913 to 1915.

[3] Good descriptions may be found by those who are not familiar with the building itself in the *Harvard Alumni Bulletin*, June 16, 1915, the *Library Journal*, May, 1915, *Architecture and Building*, August, 1915, in Potter's *Descriptive and Historical Notes*, 3d ed., 1915, pp. 32–34, and in the *Official Guide to Harvard University*, 5th or 6th edition.

The central point of the Library, excelling all else in the beauty of its design, is the room containing Harry Widener's own books, with the noble reception hall through which one enters it. Here a few of the precious volumes, drawings, and plates of the Widener collection are always on exhibition, being changed from week to week. This room is a chief attraction to visitors and its changing exhibits are watched for with in terest by many students. George Parker Winship (A.B. 1893), formerly librarian of the John Carter Brown Library in Providence, was in charge of the Widener books from 1915 to 1926.[2] He was succeeded by Mrs. Luther S. Livingston, who, as his assistant since 1915, had acquired an intimate and sympathetic acquaintance with the books.

[1] Mrs. Florence A. Milner, the custodian of the room, contributed to the *Harv. Grad. Mag.*, xxxiv (1925), 234, a pleasant account of the room.

[2] On his resignation, he was made an Assistant Librarian of the College Library as a bibliographical expert, and given charge of the Treasure Room. Since 1920 he has edited *Harvard Library Notes*, a periodical appearing two or three times a year, filled with interesting notes and articles relating to the treasures of the Library and the activities of the Library staff.

7. Administration

In Sibley's day, the Library staff consisted of the Librarian, an Assistant Librarian (after 1856), and one or two assistants; and the Library was visited annually by an Examining Committee of the Overseers, to whom the Librarian presented his annual report. In 1867 a Library Council was established, to supervise library affairs and to control expenditures. Through Winsor's day and down to 1909 the Council consisted of the President, the Librarian, and six other persons appointed by the Corporation. Its duty as expressed in the statute was 'to make rules for the administration of the Library; to direct the purchase of books to the extent of the funds applicable for that purpose; and to visit and inspect' the departmental and special libraries. The Librarian had 'the care and custody of the Library.' It was his duty 'to superintend its internal administration, enforce the rules, and conduct the correspondence; and to make annually a written report on the condition of the Library.'

This scheme worked smoothly enough in practice, though it made no provision for any real coöperation between the College Library and the department libraries, which were, in effect, independent. Mr. Winsor's inclination was at first toward centralized control, so that the several libraries might function as one. His opinion so far prevailed that in December, 1880, the Corporation directed that all books (except those for the Law School) should be bought through the College Library, and that all books acquired by gift or purchase should be sent to the College Library for cataloguing. This was not a bad plan for that period, when the departmental libraries all together counted only about 60,000 volumes, and none except the Law School had a trained staff of assistants. As years went by, and the libraries increased in size, two tendencies operated to modify this plan: the departmental libraries, and even many of the special libraries, acquired capable assistants, who often felt that they could look after their own affairs better and more promptly than the staff at Gore Hall; and the purchasing and cataloguing of books for the departments came to be a heavier burden on the central Library than it could carry. At present, the College Library handles orders and catalogues books for such smaller libraries as have not the means of doing the work efficiently themselves; but the libraries which catalogue their own books are expected to send a record of titles received, to be filed at Widener.

As the size of the College Library and the complexity of its activities increased, the Librarian was able to take less and less interest in the affairs of the other libraries; yet it was clear that some vital connection between them was desirable. In 1910, therefore, a new office was created, that of Director of the University Library, to be also Chairman of the Library Council. Subject to his direction, the Librarian continued to superintend the College Library. To strengthen the connection between the College Library and the departmental libraries, the Director was soon required to visit and inspect the latter and to be a member *ex officio* of their administrative committees. Their librarians were required to present to him an annual report. Professor A. C. Coolidge, who for years had taken an active interest in the College Library, particularly in the increase of its collections, was named as the first Director of the University Library, in November, 1910. His vigorous personality and his clear-sighted and effective plans for its development, backed by a generous enthusiasm which gave freely of his own means, have been evident from my account of the Library's recent history. As the Library Council well said in its recorded minute after his death on January 14, 1928: 'He kept before the University and its friends a broad and comprehensive idea of the Library and its possibilities, and had the satisfaction of seeing the Harvard Library under his administration reach an assured position among the great libraries of the world. This result was due in large measure to his own wisdom, vision, patient skill, and interest in every side of the Library's welfare. His own unfailing generosity stimulated the generosity of other donors, and his devotion called forth devotion and loyalty on the part of the entire Library staff. Professor Coolidge was an ideal Library Director, and did a unique and enduring work for scholarship and education.'

PRINCIPAL OFFICERS OF THE HARVARD COLLEGE LIBRARY[1]

1877–1928

Entered Library Service	
1877	Justin Winsor '53, Librarian, 1877–97. Died October 22, 1897.
1872	John Fiske '63, Assistant Librarian, 1872–79.
1855	Thomas J Kiernan, A.M. (hon.) 1892, Superintendent of Circulation, 1877–1914. Died July 31, 1914.
1879	Samuel H. Scudder '62, Assistant Librarian, 1879–82.
1881	William C. Lane '81, Assistant Librarian, 1887–93; Librarian, 1897–1928; Emeritus, 1928–.
1882	William H. Tillinghast '77, Assistant Librarian, 1887–1913. Died August 22, 1913.
1886	Walter B. Briggs, A.M. (hon.) Brown University 1913, Superintendent of the Reading Room, 1896–1904; Assistant Librarian, 1915–.
1889	Alfred C. Potter '89, Assistant Librarian, 1904–28; Librarian, 1928–.
1894	Charles A. Mahady, Superintendent of the Reading Room, 1904–.
1910	Archibald Cary Coolidge '87, Director of the University Library, 1910–28. Died January 14, 1928.
1875	Frank Carney, Superintendent of the Library Buildings, 1911–.
1895	Edward L. Gookin, Registrar, 1912–.
1894	T. Franklin Currier '94, Assistant Librarian, 1913–.
1915	George Parker Winship '93, Librarian of the Widener Collection, 1915–26; Assistant Librarian, 1926–.
1928	Robert P. Blake, A.M. 1909, Director of the University Library, 1928–.

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[1] Named (with the exception of Winsor) in order of appointment by the Corporation to a responsible position.

INDEX

INDEX

The principal general headings in this index are: ARCHAEOLOGY, LABORATORIES, LIBRARIES, PHILOLOGY, PROFESSORSHIPS, TEACHING METHODS. Fellowships and scholarships should be sought under the subject, or the names of the donors. I wish again to remind the reader that complete information on courses, scholarships, etc., must be sought in the annual catalogues of Harvard University and the complete list of endowed chairs, with their incumbents, in the Quinquennial Catalogue.

"Harvard" is omitted in names such as Harvard Law School, Harvard Glee Club, but retained in titles of periodicals and series, such as *Harvard African Studies*, *Harvard Law Review*.

Abbott, Ernest H., 113.
Abbott, Ezra, 454–5, 609, 617.
Abbott, Lyman, lv.
Abbott, Wilbur C., 173.
Academic Council, xxxii, 454.
Academic Year, xxxix n.
Adams, Charles Francis (1856), 34, 165.
Adams, Charles Francis (1888), xxviii.
Adams, Comfort A., 287, 423; portrait, 423.
Adams, Edward B., 501.
Adams, Edward L., 87 n.
Adams, George B., 459.
Adams, Henry, 154–7, 159, 179, 459, 612; portrait, 156; quoted, 168 n.
Adams, John, 178.
Adams, John Q. (1853), fellow, xxviii.
Adams, Samuel, commencement part, 178.
Administration, *see* Business, Government.
Administrative Boards, xxxiv, xxxvi.
Aerography, 551–3.
Aesthetics, 134.
Agassiz, Alexander, 406; student, 418 n.; fellow, xxviii; donations, 282–3, 323, 329; expeditions, 409; and University Museum, 371–2, 400, 404–10; marine laboratories, 392–3; 210, 382, 389; portrait, 406.
Agassiz, George R., chapter on Museum of Comparative Zoölogy, 400–12.
Agassiz, Louis, 311–2, 378, 381–2, 400–7; and geology, 307–8; expeditions, 404–5; marine laboratories, 392; 259, 330, 414, 417; portrait, 381.
Agassiz Museum, *see* Museum of Comparative Zoölogy.
Agriculture, instruction in, 508–13; views of F. H. Storer on, 510; tropical, 516.
Allard, Louis, 88.
Allen, Frederick de F., 37 n., 42–4.
Allen, Frederick J., 525.
Allen, Glover M., 396, 412.
Allen, Joel A., 382.
Allport, Gordon W., 229.
American Historical Association, 157.
American Historical Review, 157.
American literature, 80, 101.
Ames, Frederick L., fellow, xxviii, 624.
Ames, James Barr, 483, 475–87 *passim*, 495, 497 n., 85 n.; portrait, 505; competition, 502–4.
Ames, John S., 514.
Ames, Oakes, 344, 347, 365, 374–7, 515–6, xxxvi.
Ames, William, 127 n.
Amherst College, lvii n., 614.
Amory, Harcourt, 622.
Anatomy, comparative, 379–80, 391, 395; instruction split, 382–3; microscopical, 385–6, 389, 390–1; in Scientific School, 417, 421; in Medical School, 559, 568.
Ancient Languages, Division of, xxxvi; *see* Classics, Latin, Greek.
Andover Theological Seminary, 464, 466, 235.
Anesaki, M., 22.
Anglo-Saxon, 84.
Annals of the Astronomical Observatory, 292–3, 302.
Annals of Mathematics, 249.
Annapolis, Naval Academy, 251.
Antevs, Ernst, 323.
Anthony, J. C., 404.
Anthropology, chapter on, 202–15; criminal, 215; definition of, 202; Division of, 212, xxxvi; fellowships, 210; field work, 211, 215, and *see* Archaeology, American; growth of, 214–5; instruction in, 210–4; physical, 211; relation to other subjects, 202, 212; research, 211.

Appleton, Francis R., 626.

Appleton Chapel, xxxv, lvii, 108–9, 124, 352, 624.

Appointment of professors, etc., principles, xxxiv, xxxvi, lxxvii, 251; individual instances: Norton's successor, 136; Adams and Lodge, 154–6; Dunbar, 188; Putnam, 210; Lyon, 233; C. J. White, 251; Math. tutorial staff, 256–7.

Apthorp, William F., 113, 118 n.

Arabic and Aramaic, 232–3.

Arboriculture, *see* Sargent, Charles S.

Archaeology, technical course, 243; American, 202–15, collections, 204, 206, 210; exploration, 205–6, 212, 215–6; instruction, 210–1; Classical, 51, 61, 131, 134, 142; Egyptian, 241–7; Greek, 131–4, 138–9, 141–2; Oriental, 142–3, 145; Semitic, 234.

Architecture, instruction in College, 132–4, 443; in Scientific Schools, 421, 428; in School of Architecture, 136, 447–8.

Architecture and Landscape Architecture, School of, chapter on, 443–50; 431, 437.

Arequipa Observatory, 301.

Aristocracy, C. W. Eliot on, lxix–lxx.

Arnold, George F., 614.

Arnold, Horace D., 575, 625.

Arnold, James, 357–8, 508.

Arnold, John H., 500–1.

Arnold, William R., 235.

Arnold Arboretum, 357–65; 338, 342, 344; description, 361–2; buildings, 364; relation to University and City, 357–60; relation to Bussey Institution, 359–61, 510–2, 515–7.

Art, *see* Fine Arts.

Art Studies, 140.

Ashley, William J., 190–1.

Ashmun, John H., 490.

Assyriology, 233, 240.

Astronomical Observatory, 292–303; equipment, 302; expeditions, 300; foreign stations, 301–2; Open Nights, 303; organizations, 295–6, 302; photometry, 297–8, 300, 302; spectroscopy, 298–9.

Astronomy, chapter on, 292–306; Astrophysical, 298–9, 308; expeditions, 305, 300; instruction in, 303–6, 457; nautical, 305; of position, 297; relation to other subjects, 304, 417; state of, in 1877, 293–4; summary of Harvard work, 303.

Atherton, Percy L., 113, 126.

Athletic Sports, committee on the regulation of, xxxviii; President Lowell on, lxxix–lxxx.

Atkins, Edwin F., 376–7; foundation, 377, 516.

Atkinson, R. W., 113, 126.

Atwood, Wallace W., 326, 323.

Austin, Edward, 507.

Austin Hall, 507.

Ayers, Howard, 387, 389.

Babbitt, Eugene H., 82.

Babbitt, Irving, 91–2; portrait, 92.

Bacon, Robert, xxviii, 570.

Bacteriology, pioneer work in, 567.

Bailey, Irving W., 343, 514.

Bailey, Liberty H., 351–2.

Bailey, Solon I., 295, chapter on Astronomy, 292–306.

Baker, George F., foundation, 546–7.

Baker, George Pierce, 77–8, 97.

Baker, William H., 567, 592.

Baldensperger, F., 97 n.

Ballantine, Edward, 116, 126; portrait, 116.

Bancroft, George, 152, 163.

Bangs, Outram, 412.

Banks, Nathan, 396, 411.

Banks, *Governor* Nathaniel P., 402.

Barbour, Thomas, 376–7, 396, 461.

Barnard, Augusta, 501 n.

Barnard, William, 387.

Barro Colorado Biological Station, 397.

Bartlett, George A., 73, 82.

Bary, Anton de, 340.

Bates, Arlo, 102.

Bates, Oric, 207, 242.

Baxter, Gregory P., 266–8, 274–5, xxxvi; chapter on Chemistry, 269–76.

Baxter, J. Phinney, 169–70.

Beale, Joseph H., 485–6, 493, 497 n., 96.

Beck, Jean, 96.

Beebe, J. Arthur, 118, 128.

Belknap, Jeremy, 152.

Bemis, John W., 443.

Bendelari, G. A. C., 160, 86, 171 n., 89, 159.

Bennett, H. G., 127 n.

Bestelmeyer, German, 148.

Bible, The, instruction in, 80, 232–5, 239, 463–4; lessened importance of in ministry, 467–9.

Bierwirth, H. Conrad, 83.

Bigelow, George T., fellow, xxviii, 558.

Bigelow, Henry Bryant, 323, 327, 396, 411.

Bigelow, Henry Jacob, 557–8, 562, 595–6, 599.
Bingham, Hiram, 170 n.
Biological Laboratory at Soledad, 397.
Biology, as common aspect of botany and zoölogy, 386; chapter on recent developments in, 394–9; applied, 512–7; degrees in, 516; instruction in, 387, 391, 428; Division of, xxxvi; building, 375.
Biology, Applied, School of, *see* Bussey Institution.
Birge, Edward A., 383, 456.
Birkhoff, George D., 252; portrait, 307.
Black, Newton H., 291.
Blake, Clarence J., 567.
Blake, Francis, 286.
Blake, Robert P., 175, 631.
Blake, Wm. P., 118.
Blanchard, Raoul, 326.
Blaschka, Leopold and Rudolph, 372–3.
Bliss, Edward P., 138.
Bliss, Robert W., 172.
Bliss, Wm. J. A., 288.
Bloemfontein Observatory, 301.
Blue Hill Observatory, chapter on, 549–54; needs of, 554; 302, 327.
Board of Overseers, *see* Overseers.
Boardman, Waldo E., 600.
Bôcher, Ferdinand, 67–8; teaching methods, 71, 74; courses, 88–9; 73, 85, 95, 453.
Bôcher, Maxime, 249–51; portrait, 248.
Bogner, W. F., 448.
Bohlen, Francis H., 487 n.
Bohn, J. Lloyd, 143.
Bonaparte, Charles J., 453 n.
Bond, George P., 293 n., 417.
Bond, Selina C., 296 n.
Bond, Wm. Cranch, 292, 293 n.
Boott, Francis, 128 n.
Boring, Edwin G., 219.
Boss, Benj., 306 n.
Boston, departments of University in, *see* Arnold Arboretum, Business Administration, Bussey Institution, Dental School, Medical School, Public Health.
Boston City Hospital, 561–3, 565, 576.
Boston Museum of Fine Arts, 132, 134, 137, 145; and Egypt, 241–7.
Boston Psychopathic Hospital, 221.
Boston Public Library, 609–10, 618.
Boston School for the Ministry, 463.
Boston Society of Natural History, 311–2, 387.
Boston Symphony Orchestra, 113, 117, 119 n., 124.
Boston University, School of Theology, 466, joint extension service, 529.
Botanic Garden, 345–8.
Botanical Museum, 338, 340, 370–6, 367.
Botany, chapter on, 338–77; applied, 339, 343–5, 355, 375, 514; collections, 349–50, 366–76; cryptogamic, 338, 340–1, 344–5, 366–70; cytology, 339, 344, 516; dept. of, xxxvi; economic, 344, 374–5, 515; expeditions, 349–50, 355–6, 362, 368, 374; instruction, 339–45; introductory course, 340, 343; laboratories, 347, 350, 371, 375–7, 516; lecture-rooms, 375; libraries, 350, 356, 364, 369–70, 375; mycology, 366–70; publications, 351–2, 363, 368; relation to other subj., 339, 386–7, 397, 417; tropical, 344–5, 355, 376–7, 516; *see* Botanic Garden and Museum; Arnold Arboretum; Bussey Institution; Forestry.
Bowditch, Charles Pickering, 206, 209.
Bowditch, Henry Ingersoll (1828), 595.
Bowditch, Henry Pickering, 559–60; portrait, 563; 569–70, 600; 218, 380 n.
Bowdoin prizes, 55 n.
Bowen, Francis, 3, 187–8, 218, 453–4.
Boyden, Uriah A., 301.
Boylston Hall, 204–5, 262, 271, 367, 379.
Brackett, Charles A., 600.
Brackett, Jeffrey R., 225, 230.
Bradford, Edward H., 567, 575, 579.
Bradley, Abbey A., 363.
Bradley, Charles S., 480.
Bradley, Wm. L., 363.
Brandegee, Mrs. E. D., 622.
Brannan, Joseph D., 483, 485–6, 497 n.
Bremer, J. Lewis, chapter on Medical School (with F. C. Shattuck), 555–94.
Brewer, John M., 525.
Brewer, Wm. H., 351.
Brewster, Charles O., 128.
Brice, W. K., 128.
Bridgman, Percy W., 290, 291 n., 324; portrait, 307.
Briggs, Edward C., 600.
Briggs, Walter B., 613 n.
Briggs, Le Baron R., dean, xxxv, 77; teacher, 75–7, 80, 37 n., 94.
Brigham, Peter Bent and Robert Breck, foundation, 570.
Brimmer, Martin, xxviii.
Bristol, C. L., 392.
Bromfield, Henry R., 34.
Brooks, Charles F., 551, 553.
Brooks, James S., 514.

Brooks, Phillips, li, liii–lvi, 108; portrait, lviii.
Brooks, Wm. K., 383, 456.
Brown, Arthur, 446.
Brown, Rollo W., 78.
Bruce, Edw. B., collection, 142.
Brues, Charles T., 390, 396, 514.
Brun, Alphonse, 86.
Bryan, Kirk, 323, 326.
Buckingham, Charles E., 561.
Buckingham, Edgar, 288.
Buckingham, Lucius H., 73, 101.
Buckland, Wm. W., 488.
Bühler, Karl, 219.
Bulletin of the Bussey Institution, 510–1.
Bullock, Charles J., 191–3.
Burbank, Harold H., 198, xxxvi, xlix.
Burdett, George A., 113.
Bureau of Business Research, 537, 544.
Burgess, Edward, 383, 511–2.
Burkhard, Arthur, 83.
Burns, John J., 487 n.
Burr, Wm. H., 422.
Burrage, Walter L., 592.
Burroughs, Adam, 143.
Burt, Edward A., 369.
Bury, J. B., 54.
Busch, Adolphus, 148.
Business, definition of, 535.
Business Administration, *see* Graduate School of B. A.
Bussey, Benj., 508–9.
Bussey Institution, chapter on, 508–17; 343, 367, 374, 431; enrollment, 513, 516; finances, 510–2; policy of symbiosis, 517; publications, 510–1, 516; relation to Arnold Arboretum, 359–61, 510–2, 515–7; to Zoölogy, 388, 390, 396.
Butcher, S. H., 54.
Byerly, Wm. E., 249–50.
Byrne, James, xxvii–xxviii; 622.

Cabot, Arthur T., 592.
Cabot, Hugh, 592.
Cabot, J. Elliot, 453.
Cabot, Richard C., 226–8, xxxvi, 592.
Cabot, Walter M., 135.
Cadafalch, Puigi, 141.
California, University of, 10.
Calkins, Raymond, 83.
Cambridge, University of, lxxxiv.
Cameron, Robert, 346–7.
Campbell, C. MacFie, 221.
Campbell, Ian, 337.
Campbell, Leon, 300.
Campbell, Morton C., 487 n.
Campbell, Oscar J., 460 n.
Cancer Commission, 579.
Cannon, Annie J., 296, 299.
Cannon, Walter B., 390, 577; portrait, 603.
Carlyle, Thomas, bequest, 622.
Carnegie Foundation for Advancement of Teaching, 585.
Carney, Frank, 615 n.
Carpenter, Benj., 121, 126.
Carpenter, Francis A., 118.
Carpenter, George R., 79.
Carpenter, John Alden, 114, 126.
Carpenter, Niles, 228.
Carpenter, W. H., 96.
Carrington, FitzRoy, 137.
Carstens, C. Carl, 225.
Carver, Thos. N., 191, 193, xxxvi; portrait, 191.
Cary, Mrs. Edw. M., 135.
Case System, 479, 491–5, 536–8, 543.
Castle, Wm. E., 390, 391, 396, 514.
Castle, Wm. R., 78.
Cattell, Psyche, 529 n.
Caullery, Maurice, 391.
Cawley, Frank S., 83–4.
Celtic, 93.
Cercle Français, 95.
Cestre, Charles, 87 n., 97 n.
Chafee, Zechariah, Jr., 487 n.
Chaffee, Emory L., 290, 430.
Chairmen of Departments and Divisions, xxxv–xxxvi.
Chandler, Thomas C., 595.
Chandler, Thomas H., 598.
Channing, Edward, 168–9; portrait, 157; 156–7, 159, 162, 166, 181.
Chant, Clarence A., 306 n.
Chapel, compulsory to 1886, li; voluntary system, lii–lvi; choir, 108–10, liv–lvi; *see* Appleton.
Chaplin, Winfield S., 422.
Charter of Harvard College, xxvii; text, xxv–xxvi.
Chase, George H., chapter on the Fine Arts, 130–45; courses, 134, 137–8, 447; dean Grad. Sch., 457.
Chase, Philip P., 169.
Cheever, David W., 561, 563, 576, 586, 592, 380 n.; portrait, 562.
Chemistry, chapter on, 258–76; agricultural, 509; Division of, xxxvi; instruction, 258, 260, 263, 273; physical, 580; research, 251–4, 266–9, 273–5; in L. S. S.

and Eng. School, 259, 263, 270, 414–6, 419–20, 438–9; in G. S. A. S., 428; in Medical School, 564, 568,580, 583.
Cherington, Paul T., 537.
Chester, Frank D., 235.
Chicago, University of, 493.
Chiera, Edward, 143, 238–9.
Child, Francis J., 66–7, 73–5, 80, 453–4; portrait, 66; 94, 232 n., 455 n.
China, Fogg expeditions to, 142–3; Medical School of, 574.
Choate, Charles F., 418.
Christian, Henry A., 572, 575.
City Planning, 225, 229–30; School of, 449–50.
Clapp, Philip G., 117 n., 119, 126.
Clark, Henry J., 382, 402; portrait, 381.
Clark, Hubert L., 396, 411.
Clark, Walter E., xxxvi.
Clarke, J. Freeman, 158, 463.
Class, defined, xl.
Classics, The, chapter on, 33–64; department of, xxxvi, 37–52; dominant position, 34; educational values, 34, 63–4, Eliot on, lx; entrance, 36; graduate instruction, 52–63; honors, 61–2; readings in, 232 n.; readjustment to elective system, 34–6; to need for beginners' courses, 58–9; scholarships, 55 n.; undergraduate instruction, 55–63.
Clayton, H. Helm, 551–3.
Clemen, Paul, 96, 149.
Clergy, changed conception of duty of, 467–8.
Cleveland Museum of Fine Arts, 143.
Clifford, Harry E., 430.
Clifton, Chalmers, 119.
Climatology, 316; *see* Blue Hill.
Coer, Henry L., 83.
Cohn, Adolphe, 86, 94, 95.
Cole, Wm. Morse, 533, 537.
Coley, Wm. B., 570.
College, usage of term, xxvii.
College, the American, President Lowell on, lxxix–lxxx, lxxxvii.
College Library, chapter on, 608–30; administration, 629–30; buildings, 608–9, 616, 623–8; card catalogue, 609, 617–20; council, 609, 630; early rules, xxxi n.; finances, 609, 620, 624; staff, 629; growth, 608, 620–1, 628; librarian's reports, 611 n.; treasure room, 626; relation to dept. libraries, 629; research, 460; reserved book system, 612, 155; shelf classification, 614–7, 187 n.; special bequests and collections, 609, 622–3, 31, 84–7, 90, 97 n., 145, 147, 527; stack principle, 610; privilege, 613.
College Studies, chapter on, xxxix–l; in 1868–69, xlii.
Collet, Léon, 325–6.
Collins, J. Franklin, 356.
Collis P. Huntington Memorial Hospital, 574.
Columbia University, 81 n., 433 n., 493; Teachers College, 520.
Comey, Arthur C., 450.
Commencement Hymn, 129.
Commonwealth Fund, 529.
Comparative Literature, 91–2, 73–6, xxxvi, 235; degrees in, 102.
Conant, James B., 270, 275; researches, 274.
Conant, Kenneth J., 139, 448, 450, 460 n.
Conant Hall, 461.
Concentration, defined, xlvii; Ancient and Modern Languages, 62; Chem., 273; Classics, 36; Hist. and Lit., 174–5; Phil., 29; Fine Arts, 136.
Congregational Church, connection with Overseers, xxx.
Connors, John, 284.
Contributions from the Cryptogamic Laboratory, 368–9.
Contributions from the Zoölogical Laboratory, 387, 459.
Converse, Edmund C., memorial laboratory, 272.
Converse, Frederick S., 113, 116, 126; portrait, 117.
Cook, William, 82, 84.
Cooke, Josiah P., 258–63, 265; portrait, 260; and Physics, 285, and mineralogy, 332, 335; 312, 402, 417.
Cooke, Wm. P., 600.
Coolidge, Albert S., 275.
Coolidge, Algernon, 593.
Coolidge, Archibald C., historian, 166–8, 181; library director, 630, 618–9, 460; donations, 84–5, 93, 147, 622–3; portrait, 619; proposed School of Political Science, 533–4.
Coolidge, Charles A. (1881), 144, 572, 626.
Coolidge, Frederick S., 128.
Coolidge, Julian L., chapter on Mathematics, 248–57; xxxvi.
Coolidge, J. Randolph, 85 n.
Coolidge, T. Jefferson (1850), 271, 282.
Coolidge, T. Jefferson (1884), Memorial Laboratory, 272.

Coon, Carleton S., 211.
Copeland, Charles T., 75–7, 94–5.
Copeland, Melvin T., 537–8, 543.
Coquelin, Constant, 96.
Corey, Arthur D., fellowship, 55.
Corporation of Harvard College, defined, xxvii; members, xxv, xxviii; powers, xxix, xxv–xxvii, xxxiv; Eliot on, lxxiv–lxxvi.
Coulter, J. M., 351–2.
Councilman, Wm. T., 564.
Course, defined, xxxix–xl; numbered, xliii; general conduct of, number required, and grading, xliii–xlvi, li; introductory, Lowell on, lxxxv; '20' courses, 136, 162–3, 213–4, 306, 389, 454–5; defined, xl; 'University Courses,' 453, lxx.
Croft, Caroline B., 574.
Crowninshield, Francis B., fellow, xxviii, 558.
Crozier, Wm. J., 398, 393, xxxvi; on physiology, 121–28, 397–9.
Cruft, Harriet O., 430.
Cruft Memorial Laboratory, 290, 430.
Cuba, Biological Station in, 376–7.
Cubberley, Ellwood P., 520.
Cummings, Edward, 191, 193.
Currier, T. Franklin, 526, 616, 619–20.
Curtis, Charles P., fellow, xxviii.
Curtis, Geo. C., 330.
Curtis, Horatio G., 135.
Curtis, J. Freeman, 449.
Cushing, Harvey W., 573, 576.
Cushing, Sumner W., 323.
Cushman, Joseph A., 314, 267.
Cutler, Elliott C., 588.
Cutler, Charles A., 609, 614.
Cutler, Elbridge J., 453.
Cutting, Wm. B., Jr., 163 n.

Dale, Harrison C., 170 n.
Daly, Reginald A., 322–5, 327; chapter on Geology and Geography (with Davis), 307–28.
Dana, Richard H. (A.B. 1874), 32, 121.
Dana House, 292.
Dane, Nathan, 475, 477.
Dane Hall, 218, 220, 271, 506.
Danforth, Samuel, xxv.
Danforth, Thomas, xxv, lxxv.
Darwin, Charles, 151, 312, 378.
Davenport, Charles B., 389–90.
Davey, Wm. R. P., 235.
David, Charles W., 170 n.
Davis, Bradley M., 347.
Davis, Harvey N., 430.
Davis, Wm. Morris, 314–6, 321–3, 326–7; chapter on Geology and Geography (with Daly), 307–28; portrait, 333.
Davison, Archibald T., 109, lvi, 116; and Glee Club, 123–4; portrait, 116; 144, 177.
Dawson, Jackson T., 365.
Dawson, James A., 396.
Day, Edmund E., 191–2.
Day, Mary A., 356.
Deane, Charles, 165; portrait, 157.
Deans, of Faculties and Schools, personnel and powers, xxxiii–xxxviii.
Dean's List, xlvii.
Dearborn, Walter F., 221, 525, 527–9.
Degrees, A.B., xxxix–l, 421; with Distinction or Honors, xlvi–xlvii, 174–5; A.M., 452, 454–5; in Agriculture and Forestry, 512–3, 515–6; in Architecture, etc., 429, 445–6, 448–50; in Business, 534, 542; in Divinity, 235, 468–9; in Education, 458 n., 528, 529, 531–2; in Engineering, 415, 428–9, 431–2, 438; in Law, 496, 498, lxiii; in Medicine, 556, 584–5, 597, 601; Ph.D., *see* Doctor of Philosophy; in Science, xxxix, 415–6, 421, 427–9, 431, 438–41, 454–6, 425.
DeLamar, Joseph R., bequest, 579.
Demos, Raphael, 22, 29.
'Den,' The, 507.
Densmore, John H., 126.
Dental School, chapter on, 595–602; admission and length of course, 597, 599, 601; buildings, 597–9; relation with Medical School, 568–9, 595–6, 599.
Departments, of the Faculty of Arts and Sciences, xxxv–xxxvii; relations within, 24–5, 165.
Derby, George (1838), 567.
Derby, Hasket, 592.
Design, instruction in, 130–1, 133–5.
Despradelle, Désiré, 626.
Detweiler, Samuel R., 395.
Deutcher Verein, 94.
DeWulf, Maurice, 21, 96.
Dexter, Aaron, 555.
Dexter, Franklin, 587.
Dicey, A. V., 488, 501.
Dickinson, G. S., 127 n.
Diehl, Charles, 141, 175 n.
Discipline, of undergraduates, xxxvii–xxxviii, xliv–xlv; Eliot on, lxvii–lxviii.

Dissertations, *see* Thesis, Doctor of Philosophy.
'Distribution,' defined, xlvii; groups, xlvii, n. 5; effect on Fine Arts, 136–7; on Math., 253–5; Phil., 29.
Divinity School, 463–6; name changed to Theological School, 466.
Divisions, of the Faculty of Arts and Sciences, xxxv–xxxvi.
Dixon, Roland B., 24; chapter on Anthropology, 202–15; portrait, 211.
Dixwell, John J., 357–8.
Doctorate of Philosophy, first, 250; requirements, 451 n., 454; statistics of, 454, 457–60; educational value of, 459, 30, 102–3; not required at H. U., 103, 164; deflected hither from Germany, 163, 251; subjects of dissertations, 30–1, 160–3, 458–9; in Anthropology, 211, 214; Astron., 305; Classics, 54 n.; Hist. and Gov., 164; Mod. Lang., 73, 99–105; Psych., 222; Physiology, 397–9; Zoölogy, 380, 388, 397.
Dodd, Edwin M., 487 n.
Dodge, Carroll W., 345, 367.
Dodge, Edward S., 109, 113, 121.
Donham, Wallace B., 272, 536; dean, 541, 543; chapter on Business School, 533–48.
Dorr, George B., 23.
Dorsey, George A., 211.
Drama, instruction in, 61; '47 Workshop,' 77–8; collection, 97 n., 623.
Dramatic performances, 54, 63–4, 76, 95–8, 147–8.
Draper, Henry, Memorial, 298–9.
Dresel, Ellis L., 85.
Drew, John, 97 n.
Drown, Thos. M., 309, 417–8.
Duane, William, 290.
Dudley, Governor Thomas, xxvii.
Dunbar, Charles F., 180, 187–91, 197; portrait, 190; dean, xxxiv–xxxv.
Dunster, *President* Henry, xxv, 107, 231, 292.
DuPont, Alexis I., 275.
Duquesne, E. J. A., 445–6.
Dutch Language, 82, 84.
Dwight, Thomas, 383, 564, 600.

Eakle, Arthur S., 336.
East, Edward M., 344, 514.
Eaton, Ralph M., 22, 29.
Ecole Libre des Sciences Politiques, 181, 533 n.
Economic Service (or Society), Harvard, 193–5, xxix n.
Economics, chapter on, 187–201; first chair in, 188; significance of term, 189; distinction between Economics and business, 199–201; Business Economics, 534–5, 542; committee on research, 193, 195 n.; Department of, xxxvi; instruction, 191–2; 195–6, 199; Economic history, 173, 545; Economic theory, 190; relation to other subjects, 182, 189 n., 193, 199–201.
Eddy, Wm. W., 235.
Edgell, Geo. H., 136–40, 177, 446–8; chapter on Schools of Architecture and Landscape Architecture, 443–50.
Edsall, David L., 579–80, 585, 592; influence on Medical education, 580; chapter on School of Public Health, 603–7.
Education, definition of, by Eliot, lxii; views on, of H. W. Smith, 63; J. L. Coolidge, 250, 256; Eliot, lix–lxxviii; Gay, 538; Grandgent, 74; Lowell, lxxix–lxxxviii; Taussig, 201; Presidents Tucker and Hadley, lxxxii.
Education, the science of, growth and importance of, 519–20; application of psychology to, 221; apprentice teaching, 523, 531; Division of, 522, 527; and Fac. of Arts and Sciences, 518–27; problems of, 524; relation to other subjects, 521; research in 524, 528–9; Secondary, 285–6, 526, lx, lxi, lxxxi; 'teachers' courses,' 519, 521–2; Vocational, 521; *see* Graduate School of Education.
Eggleston, Julius W., 323.
Egyptology, chapter on, 241–7.
Elective System, origin and development, xxxix, xli–l; Eliot's discussions of, lxiv–lxvi; Lowell on, lxxix–lxxx; dissatisfaction with, xlv, 173, 256; effect on choice of studies, xlvi, 196; on Classics, 33–7; on History, 173; in Divinity School, 467; in Medical School, 563–4, 585.
Eliot, Charles (1882), 444.
Eliot, *President* Charles W., student, 332; elected Pres., xxviii; Elective System, xli–xlvii; aphorisms, xxiv, xlv, 230, 288, 321, 461, 557, 560; Inaugural Address, lix–lxxviii; policy, xxviii–xxxiii, xxxix–xlvii, 74, 96, 181, 444; portraits, frontispiece, lix; 'turned over H. U. like a flapjack,' 558; relation to faculties, xxxiv, xxxvi, 251, 314, 358; and Archi-

Eliot, *President* Charles W. (*continued*) tecture, 443–5; Astronomy, 294; Business Adm., 533–5, Bussey, 509–10; Chapel, 1; Chemistry, 259–60; Dental School, 600; Divinity School, 464–7; Economics, 189–90; Education, 519, 528; Fine Arts, lxxvii, 130 n., 136; Germanic Museum, 146–7; Government, 181–2; Graduate instruction, 191, 461–2, 453; Hebrew, 233, 236 n.; History, lxii, 154, 166; Law School, 478, 498; Library, 610, 624; Medical School, 557–63, 568, 570–1, 574, 584; Music, 112, 114, 119; Philosophy, 12; Physics, 279, 285; Scientific Schools, 418, 420, 425, 427, 432.
Eliot, Grace (Hopkinson), 112.
Eliot, Samuel A. (1817), 401.
Eliot, Wm. Havard, 107.
Elliott, Wm. Henry, 380 n.
Elliott, Wm. Y., 184.
Ellis, Calvin, 560–62, 595; bequest, 569; Eliot on, 561.
Elocution, xlii, 66, 75–6.
Elton, Oliver, 97.
Embryology, 386, 388.
Emerson, Geo. B., 357.
Emerson, Ralph Waldo, resident grad., 452; lecturer, 453–4; Overseer, 23; influence, 32; on History, lxii.
Emerson Hall, 31–2, 219–21, 224.
Emerton, Ephraim, 157–9, 162, 176; chapter on history, 150–7, 162–5; portrait, 157; 82, 182.
Endicott, Wm. C. (1847), xxviii.
Engineering, School of, 270–1, 431–3, 439–42; enrolment, 441; why four-year courses prevail, 431–3; proposed union with M. I. T., 433–6; reorganization in 1918, 438.
Engineering Sciences, chapter on, 413–42; Civil, 428, 438–9; Electrical, 420–1, 428, 430–1, 438–9; endowments, 414; equipment and lab., 422, 430; Mechanical, 421, 428, 438; general instruction, 416, 419, 421, 439–40; Mining and Metallurgical, 415, 417, 419, 421–2, 428, 438–42; organization, 413, 420, 421 n., 431, 437–8, xxxvi; relation with Architecture, 443–5, 448; with other subjects and Schools, 304, 417, 421 n., 439–41, 574; Sanitary, 430, 438–9, 448, 574, 603–5; summer camp, 422.
England, influence on education, 37 n., 47, 255–6; *see* Oxford, Tutorial System.
English language and literature, teaching of, before 1869, 66–7; Eliot on, lix–lxi; subsequent growth, 74–81; instruction, 69, 75–6, 80; dissertations, 99–101; survey courses, 81; relation to other subjects, 443.
Entomology, in Zoölogy Dept., 383, 385–6, 390, 396, 410; at Bussey Inst., 509, 13–4; at Medical School, 568.
Episcopal Theological School, 466–7.
Ernst, Harold C., 563, 590, 600.
Ethics, xlii; *see* Social Ethics.
Ethiopia, excavations in and history of, 243–5.
Ethnography and Ethnology, 202, 204, 211.
Ettlinger, Isador A., 337.
Eucken, Rudolph, 96.
Eustis, Henry L., 414, 416.
Everett, Charles C., 171, 464, 467, 470.
Everett, Edward, 37 n., 413 n.
Everett, Mildred, 467.
Everett, William, 37 and n., 54 n., 218, 454 n., 456.
Examinations, in courses, xliii; American practice of, lxiii–lxiv; divisional or general, xlviii, 174–5, 54, 62, 584–5; entrance, for college, xliii, lxi, lxiii, 69, 281–2; for Lawrence Scientific School, 415; 'long' (in mathematics), 250; group system, xliii n.; modern languages, 36, 69–72, 75.
Exchange Professors, 96, 23, 95–7, 173.
Experts, American suspicion of, lxiv.

Fabyan, George, professorship, 568, 604.
Faculties, Eliot on place of the, lxxi–lxxii.
Faculty, Academic (*or* College), xxxiv, lxxi.
Faculty of Arts and Sciences, xxxiii–xxxv, divisions of, xxxvi, decline in power, xxxvii; committees of, xxxiv n., xxxvi; and graduate schools, 455, 535.
Faculty of Medicine, created 1899, 568–9, 599; *see* Medical School, Dental School.
Fairchild Professorship of Comparative Law, 506.
Fairley, Lincoln, 228 n.
Farabee, Wm. C., 206, 212–3.
Farlow, Lewis H., 210.
Farlow, Wm. G., 118, 340–1, 366–8, 339, 354, 455; publications, 369–70, 380 n.; and Bussey, 510–12, 367; portrait, 365.
Farlow, Mrs. Wm. G., 368, 370.
Farlow Herbarium, 338, 354, 366–70.
Farlow Library, 366, 369–70.

Farnsworth, Henry W. and William, 628.
Faulhaber, Oscar, 82.
Faulkner, Wm. E., 576.
Faull, Joseph H., 345, 365, 516.
Faxon, Charles E., 363–4, 341, 511–2.
Faxon, Walter, 388–9, 383–7.
Fay, Sidney B., 167, 161, 166 n.
Fearing, Daniel B., 623.
Felton, *President* Cornelius C., 312.
Fenn, Wm. W. chapter on Theological School, 463–71.
Ferguson, Wm. S., 172; portrait, 173.
Fernald, Merritt L., 342, 351, 353.
Feuillerat, A., 97 n.
Fewkes, J. Walter, 383, 456.
Field, Robert F., 290.
Filene, A. Lincoln, 525.
Fillebrown, Thomas, 597.
Film Foundation, xxix n.
Finances, University, xxxiii, xli; Eliot on, lxxv, lxxviii; table of, lxxxix; *see* the various Schools and Subjects.
Finck, Henry T., 113.
Fine Arts, chapter on the, 130–45, 241, 146–9; fundamental ideas, lxxvii, 133; collections, 138–9, 141–5; Division of, xxxvi; relation to other depts., 133, 457; Museums, *see* Fogg, Germanic.
Fish, Frederick P., 536.
Fisher, Clarence S., 242–4.
Fisher, Geo. P., 453.
Fisher, Richard T., 514–5.
Fisher, Willard J., 551.
Fisher Professorship of Natural History, 339, 342, 349.
Fiske, John, 152, 165, 96, 631, 453–4.
Fitz, Reginald H. (1864), 589, 592.
Fitzpatrick, Francis G., 135–6.
Fleming, Williamina P., 295–6, 299.
Fletcher, Jefferson B., 79, 89, 91.
Fletcher, Richmond K., 126.
Flint, Geo. M., 330.
Foerster, Robert F., 225–8, 223 n.
Fogg, Mrs. Wm. Hayes, 132.
Fogg Art Museum, Old, 132–5, 137, 141–3; New, 143–5; photograph, 141.
Folin, Otto, 568, 590.
Follen, Charles, 158.
Foote, Arthur, 113, 121, 126; portrait, 117.
Foote, Geo. L., 117 n.
Foote, Harry Ward, 336.
Forbes, E. Waldo, 134–6, 143–4.
Forbes, George S., 274.
Forbes, Waldo E., 553.
Forcheimer, Walter, 119.
Ford, James, 227–9, 450, 223 n.; chapter on Social Ethics, 223–30.
Ford, Jeremiah D. M., 87–90, works 90 n.; portrait, 93.
Ford, Lester S., 511–2.
Ford, Wm. E., 336.
Ford, Worthington C., 165, 169.
Forensics, xlii–xliii.
Forestry, Dept. of, 514–5; School of, 431, 437; in L. S. S., 421; in G. S. A. S., 428, 437; tropical, 516; and Botany, 342–5; degrees in, 515; and entomology, 390.
Foster, Esty, chapter on Business School (with Donham), 533–48.
Foster, Roger S., 487 n.
Fowler, Harold N., 131–2.
Fox, Dixon R., 170.
Foye, Wilbur G., 323, 337.
France, influence on education, lxiii, 533 n.
Francke, Kuno, 82, 84, 94, 96, 157; portrait, 81; chapter on Germanic Museum, 146–9.
Frankfurter, Felix, 487, 485–6.
Freeman, Robert T., 597.
French language and literature, teaching of, 66–7, 85–9, 139; 'reading requirement,' 70–2, 98, xlviii; dissertations on, 99, 101–2; Philology, 89–90; popular lectures, 94–7; relative to other subj., 443.
Freshmen, defined, xl; studies in 1869, xlii, lxv; elective system, xliii–xlv, 35, 69; average age, xliv; halls for, initiated by Lowell, lxxxvi–lxxxvii; Freshmen or introductory courses, chart of, 195–6; in Math., 254–5; Astron., 304–5; Chem., 200; Classics, 58–9; Ec., 195–7; Eng., 69, 75, 81; French, 88; Geol., 313, 319; Gov., 184; Hist., 161–2, 170–1, 176; Phil., 29; Physics, 280–1, 285, 291.
Frick, Henry C., 243.
Frohman, Charles, 147.
Frost, Henry A., 448.
Fuller, B. Apthorp G., 22, 27, 29.
Fuller, Joseph V., 167 n.

Gale, Hoyt S., 337.
Gallaudet, Thomas H., 519.
Gannett House, 507.
Ganong, William F., 341.
Garbutt, Andrew, 443.
Gardner, John Hays, 80.
Gardner, George A., Fund, 323.

Gardner, Geo. K., 487 n.
Garman, Samuel, 403.
Garrett, A. C., 80.
Garrett, Henry, 118.
Gates, Lewis E., 75.
Gay, Edwin F., 173; historian, economist, 190–2, 545; portrait, 533; dean Business School, 534, 537, 540.
Gay, Ernest L., 622.
Gay, Frederick L., bequest, 622.
Geddes, James, Jr., 101.
General Education Board, donations for Chem., 272; Biology, 375; Law, 501 n. 506; Education, 528; Business Administration, 534.
Geography, chapter on (with Geology), 307–28, esp. 326; Historical, 153; human, 326–28; physical, 314–5.
Geological Museum, chapter on, 329–31, 318–9, 324, 400.
Geology, chapter on, 307–28; definition of, 322; Dept. of, 328; expeditions and research, 308–10, 313, 318, 321–3; field work, 315–9; instruction, 312–3, 196 n., 319, 322; relation with other depts., 325, 309 n., 409, 417, 441; Summer Schools, 313–4, 317, 325–6; applied 428, *see* Mineralogy, Mining; Climatology, 316, 326, *see* Blue Hill; Oceanography, 327–8, 403, 409–10; Paleontology, 312, 318, 324–5; Physiography, 315–6, 321, 323, 326; Seismography, 317–8.
George, Robert H., 170 n.
Gerasimovič, B. P., 306 n.
German influence on Chemistry, 263; Pedagogy, 519; Physics, 284; Higher Education in U. S., 255, lxiii; Historical Studies, 151–3, 157–8; Mineralogy, 336.
Germanic languages and literatures, instruction in, xlii, 66–8, 81–5, 149; dissertations in, 99, 100; dramatics, 98; popular lectures, 96; 'reading requirement,' 70–2, xlviii; relation to other subjects, 443, *see* History.
Germanic Museum, chapter on, 146–9.
Gibbs Memorial Laboratory, 271–2.
Gibbs, Wolcott, and Chemistry, 259–60; 263; portrait, 261; and Physics, 278–9, 281; 309.
Gillson, Joseph L., 337.
Gilman, Margaret E., 138 n.
Gilson, Etienne, 21–2
Giza, excavations at, 243–7.
Glass Flowers, 372–3.
Glee Club, 119–24, 144.
Glueck, Sheldon and E. T., 227 n., 229.
Göttingen, Univ. of, 37 n.
Golder, Frank A., 166 n.
Goldman, Hetty, 142.
Goldschmidt, Adolph, 149, 96, 141.
Goldschmidt, V., 336.
Gooch, Frank A., 456.
Goodale, Geo. Lincoln, 339–41, 352, 376; portrait, 348; curator Botanic Gardens, 346–7; museum and glass flowers, 371–4; and landscape design, 444; Fund, 375; and Bussey, 511–2.
Goodale, Joseph Lincoln, 592.
Goodwin, William Watson, 39–40; portrait, 39; 37, 453–5, n.
Goodykoontz, C. B., 170 n.
Gookin, Edward L., 631.
Goranson, Roy W., 337.
Gordon, George A., liii.
Gore, Christopher, 179, 624.
Gore Hall (Library), 536; 155, 608; reported full, 609; enlarged and destroyed 616, 623–7.
Gould, B. Apthorp, 306 n., 312, 314.
Governing Boards, *see* Corporation *and* Overseers.
Government, chapter on, 178–87; 'actual,' 183; Dept. of, 184; instruction in, 182–5; municipal, 185, 535 n.; relation to other subj., 178–80, 182.
Government and Administration of the University, chapter on, xxv–xxxviii; chart, xxxii; Eliot on, lxxi–lxxvii; of the College, xxiii–l, 24–5, 165; reorganization of 1890, xxxiv.
Grades, in courses, xxxix n.; requirements for A.B., xliii–xlv.
Graduate Department, 452, 454–5, 461, xxxii; name changed to
Graduate School, 455; *see* G. S. of Arts and Sciences.
Graduate School of Applied Biology, *see* Bussey Institution.
Graduate School of Applied Science, 428–31.
Graduate School of Arts and Sciences, chapter on, 451–62; degrees, 455–6; influence of, 457; name changed, 455; organization, 456; rel. to College, 454; Medical School, xxxvi n.; rel. with Theol. School, 469; studies, 454.
Graduate School of Business Administration, chapter on, 533–48; buildings and endowment, 534, 546–7; curriculum,

535–9, 541–2; degrees, 534, 542; ethics, 548; registration, 534, 539–40; relation with other depts., 437–40, 538; research, 536–7, 544–5.
Graduate School of Education, chapter on, 518–32; admission, 531; Bureau of Vocational Guidance, 525; enrollment, 528; foundation, 527–8; Library, 525–6; part-time instruction of Teachers, 530; publications, 524–5; relation to other depts., 255, 291, 450; reorganization of, 1927, 530–2; research, 528–9.
Graduate School of Medicine, 575.
Graduate Schools of Applied Science, 431–3.
Graduate Students and Studies, evolution of, 452–4.
Grandgent, Charles H., 88–90; chapter on Mod. Lang., 65–105; works, 90 n.; 82, 86, 144, xxxvi.
Grant, Robert, 73, 250.
Gras, Norman S. B., 545.
Graton, Louis C., 325, 430, 309 n.; portrait, 332.
Gray, Asa, 339–40, 370–1, 379; anti-Darwinian, 311–2; Herbarium, 349–51; Garden, 346; *Flora* and *Manual*, 351–3, 355; Peabody Museum, 204; portrait, 349; mentioned, 259, 309, 358, 417.
Gray, Mrs. Asa, 353.
Gray, Francis C. (1809), 132, 401.
Gray, Howard L., 161 n.
Gray, John Chipman, 480, 485, 494, 497 n., 182; portrait, 479.
Gray Herbarium, 348–57, 367; buildings and endowment, 350–5; card index, 356; curatorship, 342; publications, 459; relation to Univ., 352, 354; to other institutions, 355.
Greek, language and literature, 33–64, *passim*; 'beginners,' 58; educational value, 63–4; percentage students electing, 57; plays, 43–4, 54–5, 76, 114; in Theological School, 463, 467; *see* Archaeology, Fine Arts.
Green, C. Montraville, 592.
Green, John, 380 n.
Greenback controversy, 187–8.
Greene, Bernard R., 418.
Greene, Jerome D., 527.
Greene, William C., 52, 56.
Greenleaf, Simon, 475, 477, 490–1, 497 n., 500.
Greenman, Jesse M., 341.
Greenough, Chester N., xxxv, 77, 174.
Greenough, James B. (1856), 40–2; Commencement Hymn, 115, 129.
Greenwood, Isaac, 248.
Grey, Robert M., 376.
Griffith, F. L., 244.
Grimm, Herman, 146.
Grinberg, Morris, 119 n.
Groce, Clyde L., 170 n.
Gross, Charles, 160–1, 157, 159, 180–2.
Guernsey, Samuel J., 207–9; portrait, 211.
Gulick, Charles B., 50, 172, xxxvi.
Gummere, Francis B., 78.
Gurney, Ephraim W., dean, xxxiv–xxxv; fellow, xxviii; Prof. of history, 153–4, 179, 180; 453 n.
Guy, Henri, 97 n.

Hadley, Arthur T., quoted, lxxxii.
Haeseler, John A., 214.
Haffner, Jean-Jacques, 446–8.
Hagedorn, Hermann, 78.
Hagen, Hermann, 385–6, 404; anecdote, 386 n.
Hale, Edward Everett, liii, 562.
Hale, George E., 306 n.
Hall, Asaph., 306 n.
Hall, Edwin H., 281, 287–9; chapter on Physics, 277–91.
Hall, G. Stanley, and Psychology, 218–9, 221; and Pedagogy, 519; 30, 456.
Hall, Morris F., 275.
Ham, William T., 228 n.
Hamblin, Stephen F., 347–8, 450.
Hamilton, Alice, 588–9.
Hancock, Charles L., 234 n.
Hanford, Alfred C., xxxv.
Hanus, Paul H., 518–28; portrait, 532; early courses, 521–2; summer school, 526; isolation, 522; contacts, 524; founds School of Education, 527–8.
Haring, Clarence H., 172, 170 n.
Harper, G. McL., 95.
Harriman, Mrs. E. H., 528.
Harris, George W., 135.
Harris, William T., 9.
Hart, Albert Bushnell, 168–9; portrait, 173; 157, 159, 181–2, 186; chapter on Government, 178–86.
Harvard, Lionel de J., 623.
Harvard African Studies, 207.
Harvard–Boston Expedition, 241–7; summary, 247.
Harvard Bulletins in Education, 525.
Harvard Business Review, 544.
Harvard College, defined, xxvii.

Harvard Economic Studies, 192, 459.
Harvard Hall, 155 n., 281, 339–40, 371, 400, 608.
Harvard Historical Series, 165, 459.
Harvard Law Review, 502–4, 507.
Harvard Library Notes, 622.
Harvard Monographs in Education, 525.
Harvard Oriental Series, ix n.
Harvard Psychological Studies, 220, 459.
Harvard Semitic Series, 237–9.
Harvard Studies, in Classical Philology, 41, 459; *in Comparative Literature*, 459; *in Education*, 525; *in English*, 459; *in Philology and Literature*, 459; *in Romance Languages*, 459.
Harvard Theological Review, 467.
Harvard University, defined, xxvii.
Harvard University Press, 459.
Harwood, Daniel, 596.
Haskins, Charles H., 170–1, 176; dean, 457; portrait, 172; chapter on Graduate School, 451–62.
Hassler Expedition, 404–5.
Haupt, Lewis M., 418.
Hauser, Henri, 173.
Hawkins, Richmond L., 88–9, 460 n.
Haworth, J. F., 330.
Hayes, Hammond V., 288.
Hayes, John J., 76.
Hayhurst, Paul, 390.
Haynes, Henry H., 235.
Hazard, Paul, 97 n.
Health Officers, Harvard–M. I. T. School for, 574, 579, 603–4.
Hearst, Mrs. P. A., 241.
Hebrew language and literature 231–4, 236; in Divinity School, 467–8.
Hedge, Frederick H., 81–2, 453–4, 463.
Hedge, Levi, 3.
Heilman, Wm. C., 114, 116; portrait, 116.
Helfer, Walter, 127 n.
Hemenway, Augustus, 210, 246, 501 n.
Hemenway, Mrs. Mary, 206, 210–1.
Henderson, Lawrence J., and Chem., 261–2, 265, 275; researches, 274; in Medical School, 580, 590; 173.
Henning, G. N., 87 n.
Henshaw, Samuel, 409–12, 625.
Hepworth, George H., 463.
Herbaria, *see* Farlow, Gray, Arnold.
Herrick, Robert F., 536.
Herschel, Clemens, 418.
Hertzsprung, Ejnar, 306 n.
Hexter, Maurice B., 229.
Higgins, A. Pearce, 488.
Higginson, *Major* Henry L., fellow, xxviii; benefactor, 534, 570.
Hill, Adams Sherman, 76, 67, 73, 75.
Hill, Arthur D., 487 n.
Hill, Edward Burlingame, 113, 116–7, 126–7, xxxvi; portrait, 116.
Hill, George Anthony, 277–8.
Hill, Henry Barker, 259–60, 262–4; portrait, 270.
Hill, *President* Thomas, xlii, 34, 112, 508, 595 n., 599.
Hillery, Michael, 285.
Hillyer, Robert S., 78.
Hincks, Elizabeth M., 529 n.
History, chapter on, 150–77; method, 150–5, 170; introductory course, 161–2, 170–1, 176; seminaries, 155, 163, 171, 181; American, 152, 155–7, 168–70, 172–3; Ancient, 152–3, 172, 233, 243–5; of Art, 130–41, 173; Clubs, 165; Constitutional, 159–61, 179; Dept. of, 152–3, 165–6, 173–7; dissertations in, 164; Eastern, 166–8, 171–2, 175–6, 233; Economic, 173, 190–2, 545; educational value, 177; English, 159–61, 162–3, 173; fellowships, 163 n.; Mediaeval, 154–6, 159–62, 171, 175; Military, 167–8; Modern European, 152–3, 162, 166–7; of Philosophy, 27; of Religions, 152, 158, 171–2, 233–4, 467, 470; of Science, 173; Social, 159, 170, 177.
History and Literature, field of concentration, xlvii, 62, 174–5.
History, Government, and Economics, Division of, xxxvi, xlviii; chart of introductory courses, 194.
Hitchcock, Thos. B., 598.
Hoadley, Leigh, 395–6.
Hoar, Ebenezer R., li.
Hoar, Samuel (1867), xxviii.
Hochdorfer, K. F. R., 82.
Hocking, William E., 21, 23–4, 27.
Hodges, Harry B., 82.
Hodgson, Richard, Fund, 221.
Hoernlé, R. F. A., 22, 24 n.
Hofmann, A. W., 263.
Holcombe, Arthur N., 184–6, xxxvi.
Holden, Albert F., and Holden Fund, 333–5.
Holden Chapel, 556.
Hollis, Ira N., 422–3, 432; portrait 422.
Holmes, Henry W., 522; chapter on Grad. School of Education, 518–32.
Holmes, Nathaniel, 479–80.

Holmes, Oliver Wendell (1829), and Medical School, 379, 559–60, 562, 600; on Eliot, 558; on quantity *vs* quality of students, 581.
Holmes, Justice Oliver Wendell (1861), 481–2.
Holt, Edwin B., 219.
Homans, John, 592, 380 n.
Homer, Levi P., 107.
Honors, second-year and graduation, xlvi–xlvii; Lowell on, lxxxiv–lxxxvi; increased interest in, l; in Classics, Lit., Math., 61–2; Hist. and Lit., 62, 174–5; Mod. Lang., 72, 99; Science, 416.
Hooker, Sir Wm., 370.
Hooper, Edward W., treasurer, xxviii.
Hooper, Samuel, 417.
Hooton, Earnest A., 213, 215; portrait, 211.
Hoppin, Joseph C., 141.
Hornbeck, Stanley K., 176.
Horsford, Eben N., 312, 414, 416.
Horticulture, instruction in, 509–11; *see* Landscape Design, Arnold Arboretum.
Hosmer, James K., 453 n.
Hosmer, Ralph S., 512 n.
Housing, *see* City Planning.
Howard, Albert A., 49–50, 37 n.; fellowship, 55 n.
Howard, Wm. G., 83.
Howe, George M., 83.
Howe, Mark A. DeW., 128 n.
Howells, John M., 128.
Howells, Wm. Dean, 94, 453.
Hubbard, Charles Wells, 528.
Hubbard, Henry V., 449–50.
Hubbard, William, 152.
Hudson, Manley O., 487 n.
Hughes, Hector J., chapter on Engineering, 413–42.
Humphreys, John S., 445, 447–8.
Hung, William, 176 n.
Hunnewell, Horatio Hollis, 350, 364.
Hunt, Reid, xxxvi.
Hunt, Richard, 132.
Hunter, Walter S., 219.
Huntington, Mrs. Collis P., 571, 574.
Huntington, Oliver W., 335.
Hurlbut, Byron S., xxxv, 77.
Hurlin, Arthur M., 117 n.
Hussey, Mary I., 239.
Hutchins, Charles C., 288.
Hutchinson, Thomas, 152.
Huxley, Thomas, 384.
Hyatt, Alpheus, 311–2.
Hyde, James Hazen, 95, 67 n.
Hygiene, college lectures on, 383 n.; Industrial, 578, 580, 589, *see* Public Health; in L. S. S., 421; in Medical School, 567.

Icelandic, 80, 94.
Infantile Paralysis Commission, 578, 590.
Inglis, Alex. J., 527, 524–5.
Iowa, Univ. of, 520.
Italian language and literature, 85–90, 93–4; before 1870, xlii, 66–8; dissertations, 101–2.

Jack, John G., 342, 364, 513–5.
Jackson, Carl N., 51, 58, xxxvi.
Jackson, Charles Loring, makes first new compound, 263–4; 265, 269; chapter on Chemistry, 258–69; portrait, 455.
Jackson, Charles Thomas, 311.
Jackson, James (1796), 556.
Jackson, John B. S., 591.
Jackson, Robert Tracy, 318, 329, 374, 390.
Jacquinot, Adrien, 85, 88.
Jagemann, H. C. G. von, 82, 92–3.
Jaggar, Thos. A., 318–9, 329–30.
James, Eldon R., 501.
James, Henry (1811–1882), 8.
James, Henry (1843–1916), 96.
James, Henry (1899), 23.
James, William, Palmer's sketch of, 3–9, 25; portrait, 8; and Psychology, 216–7, 220–1, 380 n.; and Physiology, 382–3; and Education, 521; mentioned 12, 23, 27, 31, 223, 320, 382.
Jeanray, Alfred, 97 n.
Jefferson Physical Laboratory, 283–4, 288–90.
Jeffrey, Edward C., 343, 331.
Jennison, James, 76.
Jensen, Ejnar, charts of courses, 194–5.
Jesup, Morris K., 364.
Jewett, James R., 234–5, xxxvi.
Johns Hopkins University, 11, 158, 170, 180, 386, 218.
Johnson, Douglas W., 326.
Johnson, Geo. E., 450, 527.
Johnson, Lewis J., 423.
Johnston, Robert M., 167–8.
Joline, A. H., 536.
Jones, Daniel F., 576.
Jones, Grinnell, 270, 275.
Jones, Henry D., 76.
Jones, Herbert L., 341.

Jones, Lombard C., 209.
Joslin, Elliott P., 587.
Journal of the American Chemical Society, 275.
Judd, Charles H., 520.
Juniors, defined, xl; studies in 1868, xlii.

Kapteyn, J. C., 306 n.
Karpovich, M., 167.
Kazanjian, V. H., 601.
Keener, Wm. A., 482.
Keep, Nathan C., 595.
Kellner, Max L., 235.
Kemble, Edwin C., 290.
Kemp, Walter, 244.
Keniston, Ralph H., 88.
Kennedy, Geo. G., 354–5.
Kennelly, Arthur E., 423.
Kerner, Robert J., 166 n.
Kidder, Alfred V., 208; portrait, 211.
Kidder, Nathaniel T., 341, 354, 512.
Kiernan, Thos. J, 613.
Killan, Charles W., 445–67, 448.
King, Edw. S., 297, 300.
Kirkland, *President* J. T., 163 n.
Kittredge, George Lyman, 74, 80, 92, 99, 172; portrait, 80; on J. B. Greenough, 41; 96, xxxvi.
Klein, Felix, 248.
Klein, Julius, 172, 166 n., 460 n.
Klenze, Camillo von, 96.
Knight, Frederick I., 567.
Knight, George A., 128 n.
Köhler, Wolfgang, 219.
Kohler, Elmer P., 269–70; researches, 274.
Koszul, A., 97 n.
Kuhn, Hamilton, chair of Biological Chemistry, 568.
Kühnemann, Eugene, 96.
Kükenthal, Willy, 390–1.

Laboratories, Antitoxin, 513, 517; Astronomical, 304–6; Biological, 392–9; Botanical, 347, 350, 371, 375, 376–7; Chemical, 262–4, 271–2, 419; Educational Psychology, 529; Engineering, 290, 422, 430, 439; Geological, 317; Pathological, 563; Physical, 283–4, 288–90; Physiological, 218, 397, 559; Psychological, 217–20, 222; Zoölogical, 385–8, 390–7.
Laboratory teaching, begun by Cooke and Hill, 259; by Pickering at M. I. T., 294.
Lake, Kirsopp, 80, 159 n., 175 n.
Lamb, Arthur B., 270, 275, researches, 274.
Lamb, Horatio A., 128.
Lamont, Thomas W., 536.
Landes, Kenneth K., 337.
Landis, James M., 487 n.
Landscape Architecture and Design, in College, 134, 229, 444; in Scientific Schools, 421, 428, 445; School of, 448–50; relation to other subjects, 450; *see* Arnold Arboretum.
Lane, Gardiner Martin, 54, 241–3, 246.
Lane, George Martin, 38–9; portrait, 50; 'fishball' 308; 37, 454 n.
Lane, William Coolidge, 631; chapter on College Library, 608–30; 625, 136.
Langdell, Christopher C., 479, 480–97 *passim*, 475, 478; methods, 391–5; portrait, 478; pupils, 477 n.; works, 497 n.; and Library, 500–1.
Langdell Hall, 506–7.
Langer, William L., 167.
Langley, Samuel P., 551–2.
Langfeld, Herbert S., 219.
Langmaid, Samuel W., 120 n.
Lanman, Charles R., ix n.
LaPiana, George, 175–6.
Lapsley, Gaillard, 161 n.
Larsen, Esper S., 372, 336.
Laski, Harold J., 173, 187
Latin language and literature, 33–64, *passim*, 92, xlii; percentage students electing, 57; with Modern Languages, 99; and Theological School, 463, 468; Low and Vulgar, 90.
Laughlin, J. Lawrence, 156, 190, 197, 459.
Law, conceptions, problems and systems of, 472–7, 488–9; Ames's views of, 495; Langdell's, 492; Administrative, 496; Canon, 182; Comparative, 506; Constitutional, 182, 489; International, 164, 179, 185, 484, 501, 506, 509; Jurisprudence, 480, 496; Roman, 488–9, 496, 180–1, 153 n., 184; of Torts, 491.
Law School, chapter on, 472–507; summary of history and principles, 472–7; 'Stearns-Story-Greenleaf Era,' 473–5, 489–90, 498, 500; 'Parker-Parsons-Washburn Era,' 475, 479–80, 491, 498, 500; 'Langdell-Ames Era,' 475–6, 478–9, 481–4, 491–5, 487, 498, 505, 'Thayer-Pound Era,' 476–7, 484–7, 495–7, 503–5; Administration, 504–6, 485, xxxiii; admission, 498–9; Case System, 479, 491–5; Clubs, 402–4; curriculum, degrees, 496–8; endowment, 497, 506; enrolment, 499; examinations, 495–6;

Faculty, 505–6; graduate instruction and research, 477, 495–7; influence, 474, 476, 479, 493, 496; Lowell on, lxxxiv; Library, 500–1, 506, 629; professional teachers, 477–8, 487, 496; Student body and activities, 498–9; Teaching methods, 488–95; Treatises 497 n.
Law Schools, early American and English models, 472–3, 488–9.
Lawrence, Abbott, 414.
Lawrence, James, 414.
Lawrence, *Bishop* William, 272, 453 n.; fellow, xxvii, xxviii; raises endowment for Business School, 546.
Lawrence Hall, 217–8, 367, 526, 536.
Lawrence Scientific School, 413–27, 429, 379–8, 387; abolition of, a costly mistake, 431; methods of instruction, 381, 418; periods in history, 414; admission, 415; degrees, 415–6; enrollment, 426; organization, 412, 414 419–20, xxxiv; and Chem., 259, 263; Math., 253–4; Mining, 309.
Laws of Harvard College, xxxi.
Leach, Henry G., 460 n.
Learned, Wm. S., 525.
Leavitt, Henrietta S., 300.
LeBraz, Anatole, 95.
LeConte, Joseph, 11, 418.
Lectures, as teaching method, xliii, xliv, lxvi, 258, 196–9; introduction of, in History, 152–3; 'university lectures,' 94, 108, 111–2, 453–4.
Lecturers, xli.
Lee, Joseph, 23, 528.
Lee, Roger I., 576, 588.
Lee, Sidney, 96.
Legal Aid Bureau502–3, 50, 7.
Legouis, E., 97 n.
Lehman Hall, 507.
Leland Stanford, Jr., Univ., 493.
Leland, Waldo G., 170 n.
Leonard, Clair T., 117; portrait, 116.
Lewis, Clarence I., 22, 24 n., 27, xxxvi.
Lewis, Leo R., 127 n.
Libby, Henry F., 330.
Libraries of the University: Art, 145, 149; Baker, 546–7; Botanical, *see* Botany; Child, 67 n.; College, *see* College Library; Divinity, 466, 368; Educational, 525–6; Farlow, 366, 369–71; Historical, 155 n., 612; Law, 500–1, 506, 629; Lowell, 68 n.; Medical, 591; Mineralogical, 327, 335; of Museum of Comp. Zoöl., 409; of Peabody Museum, 209–10; Robbins (Philosophical), 31.
Library of Congress, 618–9.
Lichtenberger, Henri, 97.
Lieder, F. W. C., 83.
Lincoln, George L., 87, 89.
Littauer, Lucius N., 233.
Littauer, Nathan, professorship, 233–4.
Little, Clarence C., xxxviii n.
Livermore, Sam., 179, 500.
Livingston, Mrs. Luther S., 628.
Locke, Arthur W., 127 n.
Locke, Geo. H., 522.
Locke, Warren A., 108–9, 118.
Lockwood, Dean P., 460 n.
Lodge, Henry Cabot, 156–7.
Loeb, James, 122, 55 n.; donations, 128, 134, 144.
Loeb, Morris, 271.
Loeb, Mrs. Morris, 144.
Long, Bayard, 350.
Longworth, Nicholas, 113.
Lord, Elizabeth E., 529 n.
Lord, Robert H., 167–8, 460 n.
Loubat, Duke of, 210.
Lough, James E., 219.
Louvain, Univ. of, 96.
Lovering, Joseph, 277–8, 283–4, 286; portrait, 280; 312, 417.
Lovett, Robert W., 577, 590.
Lowell, *President* A. Lawrence, student, 253; teacher, 182–3; report on instruction, xlv–xlvi; gives lecture hall, 183; president, xxviii; inaugural address, lxxix–lxxxviii; policy, xlviii–xlix; aphorisms, xlvii–xlviii; and academic freedom, 19; and Blue Hill, 554, Business School, 536, Education, 530, Egyptology, 243, Medical School, 572–3, 585, 587; portraits, lxxxix, 182.
Lowell, Amy, bequest, 622.
Lowell, Francis C., xxviii.
Lowell, George E., scholarship, 55 n.
Lowell, Guy, 626.
Lowell, James Russell, 66, 68, 81, 89, 453–4; Sonnet on layman, 381; Memorial Library, 68 n.
Lowell, John (1877), 514.
Lowell, John A. (1815), fellow, xxviii, 557; donations, 350.
Lowell Institute, 12, 379–81, 466–7.
Lowery, Woodbury, 163 n.
Lowes, John L., 79, 81, 457.
Lund, Fred B., 592.
Lunt, Wm. E., 170 n.

Lutz, Frederick, 82.
Lybyer, Albert H., 166 n.
Lyman, Charles P., 569.
Lyman, Theodore (1855), 402–3, 405.
Lyman, Theodore (1897), 290.
Lyon, David G., 232–7, 241, 465; Eliot on, 237 n.; chapter on Semitic, 231–40.
Lythgoe, Albert M., 241–2.

Maclagen, E. R. D., 141.
MacVane, Silas M., 160, 180, 156, 159, 162, 173, 182.
McAdie, Alexander G., 551, 288, 324, 327; chapter on Blue Hill Observatory, 549–54; papers, 552–4.
McCollom, John H., 590.
McConnell, Ray M., 225.
McCrady, John, 382–4.
McCurdy, Wm. E., 487 n.
McDougall, Robert, 219.
McDougall, Wm., 220–1.
McIlwain, Charles H., 161, 184.
McKay, Gordon, 321; bequest, 423–5; laboratory, 439.
McKenzie, Alex., liii.
McKenzie, Kenneth, 101.
McLain, Chester S., 487 n.
McLaughlin, Donald H., 325, 309 n.
McLaughlin, James A., 487 n.
McRae, Austin L., 288.
Magoun, Francis P., 92.
Magruder, Calvert, 487 n.
Maguire, John M., 487 n.
Mahady, Charles A., 614 n.
Mahoney, John J., 529.
Mallinckrodt, Edward, Laboratory, 272.
Mallory, Frank B., 590, 592.
Mandeville Astronomical Station, 301–2.
Manly, John M., 78, 100.
Mann, Horace, Jr., 350.
Marcou, Jules, 404.
Marcou, Philippe B., 86–9.
Marine Biological Laboratories, 392–3, 397.
Mark, Edward L., 384–6, 389, 218 n.; chapter on Zoölogy, 378–93.
Marks, Lionel S., 423, 287.
Marsh, Arthur R., 91, 86, 89, 94.
Marsh, Othniel C., 203.
Martin, Selden O., 537–8.
Mason, Daniel G., 113, 126–7.
Mason, Ellen F., 236.
Massachusetts, Commonwealth of, relations with University, 407, xxv–xxvii, xxx, lxxvii, 407; grants for museum, 402, 405–6; Supreme Judicial Court invalidates 'Tech merger,' 437, Andover merger, 466; State Board of Education, 524; State Board of Health, and Bussey, 512, 517, Medical School, 573, 578, School of Public Health, 605.
Massachusetts Dental Society, 595–6.
Massachusetts General Hospital, opened, 556; and Medical School, 563–98 *passim*.
Massachusetts Hall, 197, 340, 625, 627 n.
Massachusetts Institute of Technology, early laboratory, 294; proposed union with L. S. S., 418–9, 425; with Graduate School of Engineering, 433–8; with Engineering School, 438; and Health Officers' School, 574, 603–4.
Mathematical Association (Society), 249.
Mathematics, chapter on, 248–57; in 1868, xlii, lxii; Dept. and Div. of, 249–53, xxxvi; effect of distribution, 254–5; tutoring, 255–7; in L. S. S., 253–4, 416; in School of Arch., 443–8.
Mather, Kirtley F., 325, xxxvi; portrait, 332.
Mather, Samuel, xxv.
Matthews Hall, 507.
Maury, A. C. de P. P., 296, 299.
Mayas, art and ethnology of, 144, 208.
Maynadier, George H., 80.
Mayo, Lawrence S., xxxviii n.; 457.
Means, J. Howard, 580.
Mears, Eliot G., 538.
Medical Alumni Association, 587.
Medical Faculty, lxxi, 556, 564, 589, 595; merged in Faculty of Medicine, 568.
Medical School, chapter on, 555–94; before 1869, xxxlii, lxxi, 555–7; reforms of 1869–79, 557–61; at Boylston St., 565–9; at Huntington Ave., 572–4, 578–88; admission, 581; ambulance units, 576–7; buildings, finance, endowment, 556, 562–3, 565, 568–72, 579, 588; clinical facilities, 559, 561, 563, 565, 572–3; degrees, 556, 573; enrollment, 561, 581; expansion of curriculum and staff, 563–6; fathers and sons, 592; graduate and summer courses, 575; influence on Med. education, 561, 580; length of course, 561, 582–3; Library, 591; Museum, 591; research, 559, 589–91; relation to other schools and depts., 379, 391, 397, 573–4, 595–6, 599, 603–5; scholarships, 587; student body, 560, 581–9.
Medical Sciences, Division of, xxxvi.

Mellen, Edward, 452.
Memoirs of the Peabody Museum, 205.
Mercier, Louis J., 88.
Merk, Frederick, 169.
Merriman, Roger B., 172–6.
Merwin, Herbert E., 337.
Meteorology, 326–7, 549–54.
Meyer, August R., 331.
Michael, Arthur, 270.
Michigan, Univ. of, 155 n., 520.
Milhau, Louis de, 206.
Miller, Dickinson S., 22, 27.
Miner, Leroy M. S., 601; chapter on Dental School, 595–602.
Mineralogical Museum, 332–5, 400.
Mineralogy, chapter on, 332–7; early classification, 259, 310, 327–8; Dept. of, 335, xxxvi; instruction, 335–6; and Architecture, 443; in L. S. S., 417.
Mining, *see* Engineering Sciences.
Mining and Practical Geology, School of, 417, 308–9, 314, xxix n.
Minot, Charles Sedgwick, 383 n., 563, 567, 590, 600.
Minot, George R., 590.
Minus, Susan, 355, 375.
Missirian, G. M., 235.
Mixter, S. Jason, 592.
Miyabe, Kingo, 351.
Mitchell, Jonathan, xxv.
Modern Languages and Literatures, chapter on, 65–105; administration of, 68–73; concentration in, 98–9; Division of, 73, xxxvi; dissertations, 99–104; honors, 72, 99; summary, 103–5; Univ. Lectures on, 453–4; *see also* each language by name.
Molengraaff, G. A. F., 323.
Monks, George H., 600.
Montague, Richard, liii.
Moody, William Vaughan, 78.
Moore, Charles Herbert, 130–3, 135.
Moore, Clarence B., 210.
Moore, Clifford H., 50, 172, xxxvii.
Moore, Edward Caldwell, lvi, 169.
Moore, Ernest C., 524, 527.
Moore, George Foot, 172, 150 n., 234, 470; portrait, 235.
Moors, John F., xxviii, 528.
Morey, Charles R., 140.
Morgan, Edmund M., 487 n.
Morgan, Edwin V., 90 n.
Morgan, J. Pierpont, benefaction, 570–1.
Morgan, Morris H., 48–9, 92; on Lane, 38.
Morison, Robert S., 525.
Morison, S. E., 169; chapters on Government, Administration, and College Studies, xxv–l; on History (with Emerton), 150–77.
Morize, André, 88.
Morley, Sylvanus G., 87 n.
Morris, Dave H., 128.
Morris, Wm. A., 161 n.
Morrison, George A., 122.
Morse, Edward S., 382 n., 402.
Morse, Robert G., 113, 125.
Mosher, Harris P., 590.
Motley, J. Lothrop, 152.
Motley, Thomas, 509–12.
Mount Wilson Observatory, 301.
Mower, Martin, 136.
Münsterberg, Hugo, Palmer on, 17–19; portrait, 222; and Psychology, 216, 220–1; 3, 23 n., 24 n., 27, 31.
Munro, John C., 592.
Munro, Wm. B., 183–6, 460 n.; portrait, 183.
Murdock, Kenneth B., 80–1.
Murphy, Hermann D., 448.
Murray, Charles F., 135.
Murray, Gilbert, 54, 97.
Murray, Henry A., 221.
Murray, John T., 78.
Museum of Comparative Zoölogy, chapter on, 400–12; name, 401; organization, 402, 407–8, xxix n.; expeditions, 404–5, 409–10; publications, 387; and geology, 309–10, 324, 429; and teaching and research, 382, 386–8, 396, 407–9; 372, 218.
Museum organization, instruction in, 139–40.
Music, chapter on, 106–29; benefactions, 127–8; choir, 108–10, liv–lvi; concerts, 113, 117–8, 120–5; Division of, xxxvi; Glee Club, 119–24; instruction, 107, 110, 112–7; Instrumental Clubs, 125–6; operas, 114; orchestra, 117–9; and puritanism, 106, 114, 126; relation to history, 176; vocal, 107, 124; 43, 50.
Musical Association, Harvard, 117–8.

Nash, Bennett, 68.
Nash, Nathaniel C. (1884), 375.
Natural History, xxxv n.; 339, 386, 389, 419–20; *see* Botany, Geology, Zoölogy.
Naumburg, Elken, 128 n.
Navez, A. E., 398.
Navigation, 292, 305.
Neilson, Wm. A., 79, 100.

Newcomb, Simon, 306 n., 418, 453 n.
New England Botanical Club, 350.
New England Quarterly, 175 n.
Newhall, Richard A., 170 n.
New Lecture Hall, 183, 197 n.
Newton, Geo. F., 443.
Newton Theological Institution, 466.
New York Botanical Garden, 355.
New York University, 519.
Nichols, Edward H., 576.
Nolen, John, 450.
Nolen, William W., 622.
Normal Schools, growth of, 520.
Norris, Harris W., 391.
Norse, 74, 84.
Norton, Arthur O., 522.
Norton, Charles Dyer, 449.
Norton, Charles Eliot, and Fine Arts, 130–4; as lecturer, 131; and Dante, 85–6, 89; fellowship, 55 n.; portrait, 140; mentioned, 67 n., 73, 94, 114 n., 138, 453 n., 626 n.
Norton, Richard, 134.
Nubian Archaeological Survey, 242, 247.
Numbers of Officers and Students, 1868–1929, xc.
Nuzi, excavations at, 238–9.

Observatories, *see* Astronomical, Blue Hill.
Odell, Noel E., 326.
Officers of Instruction, xl–xli, xc.
Olive, Edgar W., 341.
Oliveira Lima, M. de, 172.
Oliver, Fitch E., 592.
Oliver, Henry K., 107 n.
Olmsted, Frederick Law (1822–1903), 359.
Olmsted, Frederick Law (1894), 134, 444, 448–9.
Opdyke, Leonard, 141.
Oratory, *see* Elocution.
Osborne, T. Mott, 121.
Osgood, George L., 113, 118, 121, 126.
Osgood, Wm. F., 249–51; portrait, 249.
Osler, Sir William, 576.
Osterhout, Winthrop J. V., 343, 398.
Ostwald, Wilhelm, 23, 96.
Overseers, Board of, history and powers, xxx–xxxii, xxv–xxvii, lxxiii–lxxiv; and religious services, li; as examiners, lxiv. Visiting Committees of, xxx–xxxi, on Education, 525–8, Gray Herbarium 352–3, Library, 626, Math., 254–5, Music, 113 n., 128 n., 138, Phil., 23.
Oxford, Univ. of, 37 n., 47, xlviii, xlix, lvii n., lxxxiv–lxxxv.

Packard, Alpheus S., 392.
Packard, Lawrence B., 170 n.
Packard, Sidney B., 170 n.
Paderewski, Ignace, 119.
Page, Curtis H., 87 n.
Paine, George P., 551, 554.
Paine, John K., 107–8, 111–4, 116, 128 n.; Commencement Hymn, 129, 454 n.
Paine, Robert Treat (1887), fellowship, 31.
Palache, Charles, 327, 331, 335, xxxvi; chapter on Mineralogy, 332–7, xxxvi.
Paleontology, 312, 318, 324–5.
Palmer, Alice Freeman, 21.
Palmer, Andrew H., 551.
Palmer, George Herbert, 3, 20–1, 24–5, 27; chapter on Philosophy, 3–26, 32; portrait, 21; quoted, 461, 522; mentioned, 292 n., 31, 37 n., 75, 218, 232 n.
Papers of the Peabody Museum, 205.
Parker, Charles P., 47–8, 37 n.
Parker, Francis E., 357–8.
Parker, Geo. H., 389–90, 396, 398; chapter on Zoölogy, 344–7.
Parker, *Judge* Isaac, 472–3, 491.
Parker, William. S., 448.
Parkman, Francis, fellow, xxviii; historian, 152; horticulturist, 509–11; dislikes music, 111; bequest, 622.
Parsons, Theophilus (1815), 475, 479, 491, 497 n., 498.
Patten, William, 387.
Paulsen, Niels, 84 n.
Payne, Cecilia H., 296, 299.
Peabody, Andrew P., 236, xxxviii n., li.
Peabody, Charles, 212.
Peabody Francis Greenwood, and Social Ethics, 223–6, 230, 453, 470–1; chapter on Voluntary Worship, li–lvii; portrait, 223; Plummer Professor, li; organizes staff of preachers, lii, 96, 108, 622.
Peabody, Francis Weld, 590, 593.
Peabody, George, 203; trust fund, 203 n., 210; professorship, 205.
Peabody Museum, 202–10; building and organization, 205–6, 400, xxix n.; character and position, 208; donors, 210; exploration, 205–6; publications, 205, and Semitic Museum, 237.
Pease, Arthur S., 356.
Peck, Wm. D., 332.
Pedagogy, 519; *see* Education.
Pedro II, *Emperor Dom*, 404.

Peirce, Benjamin (1829), 218, 253, 292; portrait, 249; 311–2, 454 n.
Peirce, Benjamin Osgood (1876), student, 280; physicist, 270–80, 284, 287–9; mathematician, 249–50; portrait, 281.
Peirce, Charles S. S., 5, 32, 453.
Peirce, James Mills, 249–50, 252, 454 n.; dean, xxxv, 454 n., 455; portrait, 454.
Pennoyer Scholarships, lxxiv–lxxv.
Pennsylvania, Univ. of, 180, 210–1.
Perkins, Charles C., 454 n.
Perkins, Dexter, 166 n., 167.
Perkins, Thomas Nelson, fellow, xxviii.
Perkins Hall, 461.
Perry, Bliss, 77–8, 81, 92; portrait, 93.
Perry, Ralph B., 3, 20–4; chapter on Philosophy (with Palmer), 26–32; on Psychology, 216–22; 27, 228.
Perry, Thomas S., 78.
Perry, William G., 447.
Persons, Warren M., 193.
Peter Bent Brigham Hospital, 570, 572–3, 576.
Peterkin, Lionel D., 52.
Peters, Edward D., 429.
Petersham, Harvard Forest at, 514–5.
Petrography, 327; *see* Mineralogy.
Petrunkévitch, Alexander, 390.
Pettee, William H., 309–10.
Pfaff, Franz, 564.
Pfeiffer, Robert H., 235, 239.
Phelps, William L., 79.
Phillips, Edward Bromfeld, 293.
Phillips Brooks House, lvii–lviii, 502–4, xxxviii.
Philology, Classical, 52; Comparative, 73, 88–9, 92; Germanic, 73, 84; Indic, ix n., xxxvi; Romance, 73, 88–90; Slavic, 93.
Philosophy, chapter on, 3–32; Eliot on, lxii; James's definition of, 25; Dept. of, 24–7, 3, xxxvi; Congress of, 23; dissertations in, 30–1; Doctors of, *see* Doctorate; Experimental, *see* Physics; facilities, 31–2; honors, 26–9; numbers studying, 29; Moral, 187 n.; relation to Psychology, 216, 24 n.; to other subjects, 187, 467–8, 521–2, 253; univ. lectures on, 453–4.
Physical Sciences, Division of, xxxvi.
Physics, chapter on, 277–91; apparatus, 281; college entrance, 281–2, 285; fundamental conceptions, 291; instruction, 278–81, 284–7; in L. S. S., 415–7, 420; graduate studies and research, 280, 285, 287–90; relation to other subjects, 143, 304, 441–2; *see* Engineering, electrical; Astronomy.
Physiography, 314–5, 321, 323, 326.
Physiology, chapter on recent developments, 397–9; Dept. of, 398, xxxvi; previous instruction, 379–80, 383 and n., 390; in L. S. S., 417, 421; in Medical School, 559–568; in School of Public Health, 607.
Pickard, Greenleaf W., 551–2.
Pickering, Edward C., 294–6, 302; portrait, 298; and photometry, 297–8, 300; 418, 625.
Pickering, Henry G., 118.
Pickering, William H., 298; Mandeville Station, 301–2.
Pickman, Edward M., 177.
Pier, Arthur S., 78.
Pierce, G. Washington, 290, 430, xxxvi.
Pierce Hall, 422, 437, 439.
Pierian Sodality, 117–9, 107 n.
Piston, Walter H., 117, 119; portrait, 116.
Plimpton, George A., 526.
Plucknett, Theodore F. T., 487 n.
Political Economy, name changed to Economics, 189.
Political Science, H. U. late in field, 180; encouraged by elective system, 196; *see* History, Government, Economics.
Poll, Max, 82, 84.
Pond, Bremer W., 449.
Pope, Arthur, 135–40.
Porter, Arthur K., 140.
Porter, Charles B., 563, 592.
Porter, William T., 564, 568, 577.
Portraits, in Law School Library, 501–2.
Portuguese, 90 and n., 622.
Post, Chandler R., 135–7, 139, 141, 51, 88, 175, 460 n.
Potter, Alfred C., 621 n.
Potter, Murray A., 87, 89, 92.
Potter, Sarah E., 353.
Potter, William H., 600.
Pound, Roscoe, 486; chapter on Law School, 472–507.
Pourtalès, L. F., *Comte* de, 404–5.
Powell, Thomas R., 487 n.
Powers, Sidney, 323.
Pratt, Carroll C., 219.
Pratt, Harry R., 127 n.
Pratt, John T., 528.
Pray, James S., 449; portrait, 445.
Preachers, Staff of, liii–lvi.
Prescott, Daniel, 529 n.
Prescott, William N., 152.

President, powers of, xxix–xxx, xxv–xxvi, xxxiii–xxxiv; Eliot on, lxxvi–lxxvii.
President and Fellows of Harvard College, xxvii; *see* Corporation.
Preventive Medicine, *see* Public Health, School of.
Price, Lucien, on H. W. Smyth, 63–4.
Prichard, William M., 165 n.
Prince, Morton, 221.
Princeton University, 140–1, 249.
Prindle, Louis M., 337.
Pringle, Cyrus G., 357.
Printing, History of, 136, 141.
Pritchett, Henry S., quoted, lxxxvii.
Professors, xl–xli; Eliot on duties of, lxxii; Lowell on, lxxxv.
Professorships: Alford, 3, 21; Baker, 567; Bemis, 506; Brown, J. B., and Buckminster, 567; Bemis, Bussey, Byrne, Carter, 506; Dane, 475; Eliot, 37 n., 39, 50; Charles Eliot, 448–9; Fisher, 339, 342; Asa Gray, 342, 353; Gurney, 154 n.; Hancock, 231, 234 n.; Hersey, 379, 567 n.; Hollis (Div.), 232–3; Hollis (Math.) 248; Homans, 568; Jackson, 567–8; McKay, 424–5; McLean, 152–3, 160, 172, 179; Norton, 54 n., 97, 141; Paine, 295; Parkman, 379, 564, 567; Peabody, 205–7, 210; Phillips, 295; Plummer, li; Pope, 38, 45–50; Putnam, 567; A. L. Rotch, 550; T. M. Rotch, 567; Royall, 472, 506; Shattuck, 568; Stillman, 568; Sturgis-Hooper, 309, 321, 323, 328, 409; Weld, 506; Winn, 158–9; Williams, 567.
Programme, defined, xl.
Prothero, G. W., 173.
Provençal, 90.
Prussia, Prince Henry of, 96, 147.
Psychiatry, Dept. of, 221.
Psycho-Educational Clinic, 528.
Psychology, chapter on, 216–22; 'nasty little subject,' 8; instruction and research, 217–22; relation to Education, 221, 521; Medicine, 220; Philosophy, 24 n., 216–7; Theology, 467–8.
Psychotechnology, 221.
Public Health, School of, chapter on, 603–7; 573–4; relation to Medical School, 605.
Public Speaking, *see* Elocution.
Pumpelly, Raphael, 309, 314, 417, 454 n.
Puritanism, and Music, 106.
Putnam, Charles P., 592.
Putnam, Frederic Ward, as curator, 205–7; Peabody Professor, 210–2, 392; portrait, 210; mentioned, 311, 382, 402.
Putnam, George, xxviii, 557.
Putnam, James J., 567, 592.

Quarterly Journal of Economics, 189–92.
Quarterly Journal of Economic and Business History, 545 n.
Quincy, *President* Josiah, 107 n.
'Quiz' sections, 198–9, 170, 176, 254–5.

Radcliffe College, 77, 136, 167, 588, 613; Choral Society, 124.
Raiche, Eugene L., 88.
Rand, Benjamin, 20, 3 n., 13, 31.
Rand, Edward K., 51, 92, 141, 171 n.; portrait, 51.
Rand, Herbert W., 390, 395, xxxvi.
Randall, John W., 132.
Randall Hall, 627.
Ransome, Frederick L., 336.
Raymond, Percy E., 325, 323, 330, 412.
Read, Conyers, 164.
'Reading Period,' l, xxxvii.
Readings, evening, 232 n.; by 'Copey,' 95.
Recitations, Eliot on, lxvi; gradual abandonment of, xliii, 55–6, 196, 259; in History, 153, 158.
Redlich, Josef, 487 n.
Reeve, Tapping, 473.
Régnier, Henri de, 95.
Rehder, Alfred, 363–4.
Reisinger, Curt H., 84, 148.
Reisner, George A., 234, 241–7; Samarian excavations, 238; chapter on Egyptology, 241–7.
Religious services, li–lvii, 108–10.
'Resident Graduates,' 452–3.
Reusch, Hans, 321.
Review of Economic Statistics, 194.
Reynolds, Edward, portrait, 211.
Rhetoric, xlii, 66–7, 75–6.
Rhodes, James Ford, 165.
Rice, A. Hamilton, 210.
Rice, George S., 418.
Richards, Herbert M., 341.
Richards, Ralph W., 337.
Richards, Theodore W., 261, 270, 275; researches, 265–70, 274, 459; portrait, 271.
Richardson, Henry H., 507.
Richardson, Maurice H., 592, 600.
Richardson, William L., 569, 572.
Riddle, George, 63, 74.

Riddle, Lincoln W., 345.
Rideout, Henry M., 78.
Ripley, Aiden L., 448.
Ripley, William Z., 191–2; portrait, 191.
Rivèra, Guillermo, 88, 89.
Rives, Alexander, 452.
Robbins, Reginald C., 23; Library, 31.
Robertson, Forbes, 97.
Robinson, Benjamin L., 342, 351, 353, 82; chapter on Botany, 338–77.
Robinson, Edward, 132, 134.
Robinson, Edward S., 219.
Robinson, Fred N., 93, 74, 81, 90, 172.
Robinson, Geo. W., 457.
Robinson, John, 364.
Robinson, Nelson, 443–5.
Robinson Hall, 422, 445.
Rock, Joseph F., 362.
Rockefeller, John D., Jr., 570–1.
Rockefeller Foundation, 604–6.
Rocky Mountains, exploration of, 308, 314.
Rogers, David C., 225.
Rogers, Meyrick R., 144.
Rogers, William A., 297.
Rogers, William B., 311.
Rogers Building, 147, 422.
Rolfe, E. C., 595.
Rollins, Hyder E., 80–1.
Romance Languages, Dept. of, 73 and n., xxxvi; instruction in, 66–8, 85–90, 93; dissertations, 99, 101–2; *see* French, Italian, Spanish, Portuguese.
Ropes, James H., 51, 234.
Ropes, John C., 165.
Rosenau, Milton J., 573, 603.
Rosenbusch, Harry, 336.
Ross, Denman W., 134, 142, 114 n.
Rotch, A. Lawrence, 549–50.
Rotch, Edith G., 422.
Rotch, Thomas M., 567.
Rotch Laboratory, 422, 439.
Rothschild, Alonzo, 622.
Rowe, Alan, 245–6.
Rowe, L. Earle, 243.
Royall, Isaac, 472.
Royce, Josiah, 3; Palmer on, 9–15; portrait, 9; 25, 27, 32, 75, 227; and Psychology, 216; and Education, 519, 521.
Runkle, John D., 418.
Russell, Bertrand, 22.
Russell, Frank, 211–2.
Russell, Henry N., 306 n.
Russell, James E., 520.
Russian, 93.
Sabine, Wallace C., 285, 287–9; portrait, 289; dean, 429.
Sachs, Arthur, 140.
Sachs, Paul J., 138–9, 143.
Safford, Charles L., 127 n.
Salaries, xli.
Salisbury, Stephen, 210, 236.
Samaria, excavations in, 238.
Sampson, Ralph A., 306 n.
Sanborn, Francis G., 509.
Sanborn, Franklin B., 223.
Sanderson, Robert L., 86–7.
Sandys, J. E., 54.
Sanger, Charles R., 261, 265, 269.
Santayana, George, 3; Palmer's sketch of, 15–17; portrait, 20; mentioned, 3, 23 n., 27, 32, 134.
Sargent, Charles Sprague, 339; curator Botanic Garden, 346; Arnold Arboretum, 358–65; early difficulties, 359; works, 363; portrait, 364; memorial fund, 365; 338 n., 511.
Sargent, Daniel, 78.
Sarton, George, 97, 173.
Saunders, Frederick A., 290, xxxvi.
Sauveur, Albert, 423; portrait, 423.
Sayles, Robert W., 317, 324, 329; chapter on Geol. Museum, 329–31; fund, 323.
Sayre, Francis B., 487 n.
Sax, Karl, 344, 365, 516.
Scandinavian Studies, 74, 84 and n.
Schaub, Lincoln F., 537, 540, 543.
Schenck, Frederic, 175.
Schiff, Jacob H., 236–8.
Schilling, Hugo K., 83.
Schlesinger, Arthur M., 170, 177, xxxvi.
Schmitt, George A., 66.
Schöne, Richard, 147.
Schofield, William, 180.
Schofield, William Henry, 91–2, 174, 74, 84 and n.
School for Social Workers, 225.
School of, *see* Architecture, City Planning, Landscape Architecture, Health Officers, Mining, Public Health.
Schumacher, Gottlieb, 238.
Sciences, strength of H. U. in the, 1870, 249; 1927, 328; Pure and Applied, distinction between, 442; chart of introductory courses, 195; great professors of, not members College Faculty, 259; general course in, 42; *see* Lawrence Scientific School; Graduate School and Schools of Applied Science; Engineering School; Bussey Institution; Labora-

Sciences (*continued*)
tories and names of individual sciences, and museums.
Scott, Austin W., 487, 485–6.
Scudder, Samuel, H., 382, 402, 617.
Searle, Arthur, 296 n.
Sears, George G., 593.
Sears, Henry F., 565.
Sears, Philip H., fellowship, 31.
Sections, *see* Quiz sections.
Sedgwick, William T., 603.
Seiniger, Samuel, 119 n.
Seminaries, *see* Teaching Methods.
Semitic, chapter on, 231–40; Dept. of, 232 n.; educational value, 235–6; exploration, 238–9; instruction, 231–6; and Theological School, 233; *see* Hebrew.
Semitic Museum, 236–40.
Seniors, defined, xl; studies in 1868, xlii.
Sessions, Roger H., 126–7.
Seymour, Arthur B., 369.
Shaler, Nathaniel S., 310–14, 318–21; aphorisms, 313, 316, 325, 328; dean of L. S. S., 422–5, 429, 432; Geology 4, 313, 196 n., 319; portrait, 320; teaching methods, 319; and Zoölogy, 382–3; mentioned, 134, 309, 402, 418, 444–5, 456, 523; memorial fund, 323.
Shapley, Harlow, 295, 299, 301–3; portrait, 307.
Shattuck, Frederick C., 573, 575, 578–9, 555 n., 571, 587; portrait, 587; chapter on Medical School (with Bremer), 555–94.
Shattuck, George C. (1831), 561.
Shattuck, George C. (1901), 575.
Shattuck, Henry L., treasurer, xxviii.
Shaw, Arch W., 537–8.
Shaw, Edwin A., 529.
Shaw, George R. (1869), 363.
Shaw, Quincy A. (1845), 405–6.
Shaw, Robert Gould (1869), 97 n., 623.
Shea, Daniel W., 288.
Sheffer, Henry M., 22, 27.
Sheldon, Edward B., 174 n.
Sheldon, Edward Stevens, 90, 82–6, 89, 73.
Sheldon, Frederick, travelling fellowships, 163 n., 323, 459–60.
Sheldon, Samuel, 288.
Shepard, Luther D., 595.
Shipman, Henry R., 170 n.
Shippen, Eugene R., 122.
Shopwork, 420–1.
Shorey, Paul, 54.
Shurtleff, Arthur A., 444, 448–50.
Sibley, John L., 608–9; portrait, 618.
Sill, Edward Rowland, 11.
Sills, Kenneth C. M., 79.
Silsbee, Nathaniel, xxviii.
Silz, Walter, 83.
Simmons College, 225.
Simpkins, John, 422.
Singer, Edgar A., Jr., 219.
Siple, Walter H., 144.
Skinner, Macy M., 235.
Slade, Daniel D., 388, 509.
Slater, John C., 290.
Slavic, 93.
Slominsky, Nicolas, 119.
Smith, Charles Sprague, 94.
Smith, Clement L., 42, xxxiv–xxxv; quoted, xliv.
Smith, Elliot D., 229.
Smith, Eugene Hanes, 599, 600–1; portrait, 602.
Smith, Jeremiah (1856), 482, 485.
Smith, Jeremiah (1892), fellow, xxviii.
Smith, Melville, 127 n.
Smith, Theobald, 512, 568, 604.
Smithsonian Institution, 355.
Smyth, Henry Lloyd, 325, 309 n., 330, 423; portrait, 423.
Smyth, Herbert Weir, 63–4, 37 n.; chapter on the Classics, 33–63.
Snow, Freeman, 78, 156, 159–60.
Social Ethics, chapter on, 223–30; Dept. of, xxxvi; name, 230; Peabody, conception of, 223; instruction, 223, 225–9; publications, 225 n., 228 n.; relation to other fields, 193, 227–9, 450, 470–1; seminary, 227.
Social Museum, 224.
Sociology, 193; concentration in, 228; and Education, 521; *see* Social Ethics.
Soldiers Field, Eliot on, lxxviii.
Soledad, Cuba, experimental station, 377, 566.
Somers, Ransom E., 337.
Sophocles, Evangelinus Apostolides, 37–8, 453 n.; portrait, 38.
Sophomores, defined, xli; studies in 1868, xlii.
Southard, Elmer E., 221, 580.
Spalding, Walter R., 127; chapter on Music, 106–29; portrait, 116.
Spanish language and literature, instruction, 66–8, 85–90; dissertations, 101–2.
Sparks, Jared, 152–3.
Spinden, Herbert J., 208, 211.

Sprague, Adelbert W., 127 n.
Sprague, Oliver M. W., 538.
Sprengling, Martin, 235.
Sperry, Willard L., 466, 470.
Squam Lake, 422.
Squier, Ephraim G., 204.
Stack (Library), defined, 610 n.
Starck, Taylor, 83–4, xxxvi.
Starr, Comfort, fellow, xxv.
Statutes of the University, xxxi, lxviii.
Stearns, Ashahel, 473–4, 477, 490, 506.
Stearns, Oliver, 463–4.
Steindachner, *Baron*, 404.
Stephens, H. Morse, 157.
Stephenson, Carl, 170 n.
Stetson, Harlan T., 305.
Stetson, Henry C., 330.
Stetson, John B., Jr., 90 n., 209, 622.
Stevens, Henry H., 83.
Stewart, W. A., 246.
Stillman, James, 568.
Stimpson, William, 311–2.
Stimson, Frederic J., 182.
Stoddard, Lothrop, 166 n.
Stoke, Stuart M., 529 n.
Stone, Henry L., 117 n.
Stone, Galen L., 142.
Stoner, Clarence B., 537.
Stonestreet, L. A., 119 n.
Storer, Francis H., 509–2, 516.
Storrow, James J., 527, 536.
Story, Joseph, 474–7, 490, 497–500.
Strobel, Edward H., 483–4.
Strong, Richard P., 575–6.
Student Council, xxxviii.
Sudan, Excavations in, 243–4.
Sullivan, James, 171 n.
Sully, James, 221.
Sumichrast, Frederic-César, 86–9, 98.
Summer Schools, 518, 526; Anthropology, 212; Biology, 392–3; Engineering, 422; Education, 526, 530; Medicine, 575; Theology, 365.
Swain, George F., 429.
Swift, John B., 592.
Swift, Lindsay, 156.
Sylvester, J. J., 248.

Tables of Growth, lxxxix–xc.
Tardieu, André, 95.
Tatlock, John S. P., 79, 92.
Taussig, Frank W., 190–2, 197, 181; chapter on Economics, 187–201; tutor, xlix; and Business School, 533–4; portrait, 455.
Taylor, Charles Holt, 161.
Taylor, Frederick W., 536.
Taylor, Graham, 223.
Taylor, Henry Osborn, 156.
Teachers, training of, in Math., 255; Law, 477 and n.; Business, 542; *see* Education.
Teaching Methods, review of, in College, xli–l, 173–5; block system, 583–4; case system, 479, 491–5, 536–8, 543; field work, 315–6, 319; laboratory teaching introduced, 259, 278–9, 388; movies, 213–4; seminary method, 459, 155, 163, 171, 181, 496; *see* Elective System, Tutorial System; J. L. Coolidge on, 250–2, 256; Eliot on, lxi–lxvi; in Architecture, 447; Business Administration, 535–8, 542–3; Chemistry, 258–62; Classics, 34, 44, 55–63; Economics, 191–2, 195–9; Engineering, 430–1; English, 69–70, 75–6, 104; Fine Arts, 131, 133; French and German, 70–2, 84, 89, 104, lxi; Geology, 315–20; Government, 181, 183–4; Law, 488–95, 472–7, 480; History, 152–3, 155–9, 161–3, 168 n., 173–7; Mathematics, 251–5; Medicine, 556–7, 560–1, 566, 580; Music, 107, 110, 115–7; Philosophy, 6, 17, 20, 25–30; Sciences, lxi, 381, 418; Zoölogy, 379, 382–8.
Temperley, Harold, 173.
Terms, of academic year, xxxix n.
Textbooks, abandonment of, 196; early use of, 258; Eliot on, lxvi.
Thaw, Mary Copley, 211.
Thaxter, Roland, 341, 367, 368, 338, 345.
Thayer, Ezra Ripley, 484–5, 476.
Thayer, James Bradley (1852), 481, 494, 497 n., 182; portrait, 504.
Thayer, James Bradley (1921), 487 n.
Thayer, John E., 189, 355.
Thayer, Joseph Henry, 465, 468, xxviii.
Thayer, Nathaniel, 350, 404; xxviii.
Thayer Scholarships, xxix n.
Thayer, William Roscoe, 78.
Theatre Collection, 97 n.
Theological School, chapter on, 463–71; name adopted, 466; undenominational foundation, 464; religious affiliations of teachers, 465; Andover merger, 466; elective system, 467; degree requirements, 469; relation with College and Graduate School, 469, 471; scholarships, 470.

Theology, changing conceptions of, 467; instruction in, 232–3, 463–71; relation to other subjects, 467–8.
Theses, undergraduate, in courses, 161, 199; for A.B., 174; *see* Doctorate.
Thomas, Charles S., 525.
Thomson, William, 235.
Thompson, George, 286.
Thompson, Lewis S., 113, 126.
Thompson, Randall, 127 n.
Thorndike, Edward L., 221.
Thorndike, Paul, 592.
Thurber, C. H., 526.
Ticknor, George, 452, 65, 89.
Tillinghast, William H., 616.
Titchener, John B., 52.
Torrey, Henry A., 264–5, 269.
Torrey, Henry W., 153, 179, 157, 165 n., 454 n.; portrait, 157.
Toy, Crawford H., 171–2, 232, 234, 236, 465; portrait, 234.
Tozzer, Alfred M., 212, 460 n., xxxvi; portrait, 211.
Treasurers of Harvard College, xxv, xxvii–xxviii.
Treat, John H., 87.
Trelease, William, 351–2.
Trenholme, Norman H., 161 n.
Troland, Leonard T., 219–20.
Tropical Medicine, School of, 575, 604.
Trotter, Reginald G., 170 n.
Trowbridge, John, 277–82; 286–9; portrait, 288; Director Physical Lab., 286–9.
Trumbauer, Horace, 627.
Tucker, Ethelyn M., 364.
Turner, Frederick J., 169.
Tutorial System, xlix–l, 174–5; in Classics, 56 n.; Economics, 198–9; L. S. S., 418; History, 174–5; Math., 256–7; Philosophy, 29; Theology, 469; why later in Sciences than in humanities, 175–256; why not in Chemistry, 273.
Tutors, defined, xli, xlix.
Tuttle, Albert H., 383, 387.
Tweedy, Donald N., 127 n.

Unitarianism, in Corporation, xxvii; in Divinity School, 465.
University, usage of term, xxvii, 413 n.
University Council, xxxiii, 582.
University Extension, 529–30.
University Hall, xxxiv–xxxv.
University Lectures, 453–4, 94.
University Library, 630; *see* College Library.
University Museum, xxxii; building, 400–12; *see* Botanical, Geological, Mineralogical, Museum of Comparative Zoölogy, Peabody.
Usher, Abbott P., 460 n.

Van Brunt, Henry, 610.
Vanderbilt, Harold S., 588.
Vanderbilt Hall, 588.
Varrell, Harry M., 170 n.
Vatican Library, 610.
Verrill, Addison E., 311–2, 382, 402.
Veterinary School, 568–9, 512, 517.
Vingradoff, *Sir* Paul, 488.
Virginia, Univ. of, 249.
Voluntary Worship, chapter on, li–lvii.

Wadsworth, Marshman E., 311.
Wadsworth, Oliver F., 592.
Wainwright, Jonathan M., 118.
Walcott, Henry P., xxviii, 380 n.
Waldo, Leonard, 296 n.
Walker, C. Howard, 137, 447.
Walker, *President* James, 3, 203, lxxi; fellowship, 31 n.
Walz, John A., 83–4.
Wambaugh, Eugene, 482, 485–6.
Wandtke, Alfred, 337.
Warburg, Felix, 128, 528.
Warburg, Paul, 128.
Ward, Robert DeCourcy, 316, 326, 330, 551; portrait, 332.
Ware, Charles E., 373.
Ware, Henry, 158.
Ware, Mary L., 373.
Ware, William R., 610.
Warner, Langdon, 142.
Warren, Edward H., 485–6, 497 n.
Warren, Edward P., 132.
Warren, Harold B., 448, 450.
Warren, Henry C., 210.
Warren, Herbert Langford, 132, 148, 443; portrait, 444; dean of School of Arch., 444–7.
Warren, John (1771), 555–6.
Warren, John Collins (1797), 379, 556, 591.
Warren, John Collins (1863), 569–70, 587, 590, 592; portrait, 586.
Warren, Joseph, 485–7.
Warren, Minton, 45–6, 37 n.
Warren, Susan C., 210.
Warren Anatomical Museum, 591.

Washburn, Emory, 479–80, 475, 491, 497 n.
Waterhouse, Benjamin, 332, 555.
Waterman, Thomas, 383.
Watson, Benjamin M., 511–2.
Watson, Sereno, 339, 351.
Weatherbee, I. J., 595.
Webster, Arthur Gordon, 288.
Webster, Charles K., 167.
Webster, Hollis, 341.
Webster, John W., 332.
Webster, Kenneth G. T., 80.
Welch, William H., 571.
Weld, Mrs. William G., 355.
Wells, David A., bequest, 192.
Wendell, Barrett, 75–7, 174–5; portrait, 67; in France, 95; *Raleigh*, 97.
Wendell, Evert J., 97 n., 623.
Wendell, Oliver C., 296 n., 297, 299.
Wentworth, Mary M., 529 n.
West, Louis C., 243–4.
Westengard, Jens I., 484–6.
Western Reserve University, 576.
Weston, George B., 88.
Weston, William H., 344–5, xxxvi.
Wetmore, Ralph H., 344.
Wetzel, Hervey E., 138.
Whatmough, Joshua, 93.
Wheeler, Noel, 246.
Wheeler, William Morton, 513, 377, 390, 396; portrait, 407; chapter on Bussey Institution, 508–17.
Whipple, George C., 430, 603.
White, Alfred Treadway, 224, 230.
White, Benjamin, 513.
White, Charles J., 251.
White, George, 284.
White, George Robert, 354–5.
White, Horatio S., 83.
White, James Clarke, 557, 566.
White, John W., 44–5, 37 n., 54 n.
White, William A., 623.
Whitehead, Alfred N., 21.
Whiting, Arthur, 127.
Whiting, Harold, 280–1, 284.
Whitney, Edward Allen, 175–6, 150 n.
Whitney, Josiah Dwight, 307–10, 409, 417; portrait, 321.
Whitney, William Dwight, 307–8, 310, 94.
Whitney, William Fiske, 591.
Whittem, Arthur F., 88–9.
Whittemore, Charles A., 448.
Whittemore, Frank B., 113.
Whittle, Charles L., 336.
Whittlesey, Derwent W., 326.
Wickersham, George W., 536.
Widener, Mrs. George D., 623, 626–8.
Widener, Harry Elkins, 623, 626–8.
Widener Library, 627–8.
Wiegand, Karl M., 356.
Wiener, Leo, 93.
Wilder, Burt G., 380 n.
Wilkins, Ernest H., 87.
William II, 147.
Williams, Henry W., 566–7.
Williams, John Henry, 460 n.
Williston, Samuel, 485–6, 497 n.
Willoughby, Charles C., 207–8; portrait, 211.
Willson, Robert W., 280, 288–9, 304–5; portrait, 306; and Physics, 280.
Wilson, Ernest H., 362, 364.
Wilson, George G., 185; portrait, 183.
Wilson, Herbert C., 306 n.
Wilson, John, 448.
Wilson, Woodrow, quoted, lxxxvii.
Winchester, N. H., Harvard Forest 514 n.
Winfield, Percy H., 488.
Winlock, Joseph, 293–4.
Winship, George P., 136, 628.
Winslow, Kenelm, 341, 512 n.
Winsor, Justin, historian, 155; and Boston P. L., 609–11; College Librarian, 611–2, 617, 629, 460; portrait, 157.
Winter, Irvah L., 76.
Winthrop, John (1732), 248, 292.
Winthrop, Robert C. (1828), 203.
Wister, Charles J., 128 n.
Wister, Owen, 113.
Wolcott, J. Huntington, 210.
Wolcott, Roger, 85 n.
Wolff, John Eliot, 310, 333–6, 321, 327–9; portrait, 333; Fund, 335.
Wolfson, Harry A., 233–4, 22, 239.
Women in University, Eliot on, lxx–lxxi; Bussey Inst., 509; catalogues, 296 n.; College Library, 609; Graduate School of Education, 528; Medical School, 588–9; Observatory, 295–6.
Wood, Carl P., 127 n.
Wood, Harry O., 337.
Woods, James H., 21, 23 n., 24 n., 27.
Woodworth, G. Wallace, 109, 117; portrait, 116.
Woodworth, Jay B., 317–8, 321, 323, 329–30, 316.
Woodworth, William McM., 389–90, 410.
World War, and Astronomy, 305; Blue

World War (*continued*)
  Hill, 551; Botanic Garden, 347–8; Business School, 539; Chemistry, 275; Dental School, 601; Economics, 192; Engineering, 437–8; Fine Arts, 139; German, 83–5; Law School, 499; Medical School, 576–8; Philosophy, 14, 19.
Wright, Charles H. C., 87, 98.
Wright, Chauncey, 8.
Wright, John H., 46; Grad. School, 456–7.
Wright, John K., 167.
Wright, Orville, 551.
Wright, Vernon A., 443.
Wulsin, Frederick R., 211.
Wyman, Bruce, 484–5, 497 n.
Wyman, Jeffries (1833), anatomist, 378–82, 592 n.; curator Peabody Museum, 204, 379; portraits, 380, 381; mentioned, 259, 311–2, 567–8 n.
Wyman, Jeffries (1923), 396.
Wyman, Morrill, 592.

Yale University, lvii n., 155 n., 493.
Yeomans, Henry A., xxxv, 184–5.
Yerkes, Robert M., 219–20.
Yiddish, 93 n.
Young, Allyn A., 192; portrait, 191.
Young, Edward J., 232, 464.
Young, Ernest, 156, 162 n., 180–1.

Zerrahn, Carl, 118.
Ziegler, William, Jr., 547.
Zoölogy, chapters on, 378–97; applied, 509, 513–4; technique, 383–4, 388; department specialties, 391; new conceptions, 394–5; instruction, 379, 381–7, 390–1, 395–7; publications, 387; relation to other subjects, 379, 386, 394–7, 44; *see* Anatomy, Biology, Entomology, Museum of Comparative Zoölogy, Physiology.
Zoölogy Hall, 304 n., 311, 401.

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